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Implementing the Converged Enterprise

Where do you turn?

The Internet Protocol has won the protocol wars, emerging as the overwhelming connectivity choice for corporate data transport. But in a world where telecommunications growth is coming from the data — not voice — side of the house, a change in the voice/data technology paradigm is inevitable.

To implement an integrated network requires the careful orchestration of a number of elements. And, for a successful implementation, you need all of these components to interoperate — an awesome challenge that requires adherence to a multitude of standards.

For assistance with this undertaking, attend **Voice, Fax and Video over IP: Implementing the Converged Enterprise** taught by **Mark Miller of DigiNet Corporation**. This seminar will give you a complete understanding of the multimedia applications requiring integrated voice/data/video/fax transmission, the network architectures necessary to support those applications, and the standards that are in place to ease your interoperability concerns. You'll leave knowing what it takes to design and implement an integrated network that delivers cost savings and increased manageability.

Benefits of Attending

- Become cognizant of and understand the key driving factors behind the voice over IP initiatives: client applications and economic benefits
- Examine the technical differences between voice over the Internet and voice over a corporate intranet
- Determine how the multimedia standards for audio/video coding, signaling and call management fit together
- Learn how Quality of Service (QoS) issues become key factors for a successful multimedia network implementation
- Examine the constraints voice, fax and video applications place on an IP network design and how to get around them
- Discover how key factors such as bandwidth management, quality of service, and reliability can impact your network implementation
- Have your specific questions answered by the leaders in the vendor community when you speak with them directly and see their live demonstrations

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Seminar Outline

See the Sponsor Showcase for important information about leading voice over IP vendors.

TURN TO INSIDE BACK COVER

The challenge of implementing a fully converged network will likely be presenting itself to you in the near future. If you are considering an IP-centric, integrated voice/data/video network infrastructure, you'll have to understand the applications, architectures, benefits and difficulties of implementing such an infrastructure.

● Network Convergence

For over two decades, the networking industry has been moving toward the convergence of the integrated voice/data/video network, starting with voice/data PBXs, shared use of T-1 lines, and now moving toward voice-enabled Web sites and store and forward fax. The ubiquity of the Internet Protocol (IP) now makes it that much easier to design and deploy the integrated network. We will consider:

- Legacy networks: voice, data and internets
- Integrated applications
- Benefits of the converged network
- Convergence requirements — putting it all together

● Applications and Case Studies

Theory and standards are of little value unless there are some real world uses for the technology. Explore a number of case studies that consider how voice, fax and video streams have been integrated into a single IP-based network.

- Inter-PBX communications — voice tie-line replacement
- Regional bank using voice and fax over IP
- International fax over IP
- Video over the Adirondack Area Network

● The Business Case

Supporting new applications is important to the growth of any enterprise. However, your bottom line financial questions center on timing and cost factors. You will leave this seminar understanding the business reasons for implementing voice over IP including:

- Business objectives
- Usage growth
- Revenue growth
- Market forecasts
- Economic analysis

● Voice over IP

Voice over IP is one of today's hottest topics, but what does the term mean? How do voice over IP networks operate? How do all the pieces fit together? Are the standards ready for primetime? You'll know after you consider:

- Key issues
- Players in the marketplace: networking vendors, LECs, IXCs, ISPs and ITSPs
- Call processing: the marriage of analog voice and packet data transport
- Standards for digital telephony and codecs
- Implementation agreements
- Architectural building blocks
- Network configurations
- Voice gateway operation

● Fax over IP

When used with the public switched telephone network (PSTN), the fax machine is easy. However, fax over an IP network is a different story with idiosyncrasies and network requirements that demand a close look. We will highlight some of these challenges including:

- Fax usage characteristics
- The fax marketplace
- Store and forward fax
- Real-time fax
- Fax standards from the ITU-T and IETF
- Network configurations
- Fax gateway operation

● Video over IP

Transmitting video over packet networks, which may also incorporate audio streams, poses new challenges for you. It is important that you understand how video signals can be incorporated into the IP infrastructure to effectively incorporate this technology into your environment. We will cover:

- Video communication objectives
- Applications for video transport
- Video codecs
- Video standards from the ITU-T
- Signal aberrations and packet loss
- Network configurations
- Video gateway operation

● Multimedia Standards

A plethora of standards have been written that apply to voice, fax and video services over IP-based internetworks. Once you have a clear understanding of the various families of standards, you will see how they can be integrated to provide a comprehensive multimedia solution:

- The ITU-T H.320 series
- The ITU-T T.120 series
- The ITU-T G.700 series
- The IETF Internet standards
- Application Programming Interfaces (APIs)
- The VoIP Implementation Agreement
- The importance of H.323 interoperability

● Network Design Considerations

Voice over the Internet and voice over the corporate intranet are not the same — many design factors such as latency and packet loss must be considered. A review of some of the technical aspects of a converged network will give you an understanding of these important design factors:

- The five nines of reliability: 99.999%
- Traffic analysis
- Bandwidth considerations
- Signal coding and compression
- Latency factors
- Codec selection
- Quality of Service (QoS) issues

● Implementing the Converged Network

Digital voice, audio fax, and packet data technologies can successfully coexist. Many of the necessary resources to accomplish this are already available. However, attention must be paid to how all of the pieces fit together. We will address:

- Current multimedia challenges
- Domestic vs. international deployment
- Implementation strategies
- Regulatory considerations
- Maturation of the standards
- Trends to watch

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Mark A. Miller, P.E., is President of DigiNet Corporation, a Denver-based consulting engineering firm providing services in internetwork design, strategic planning, network management and new product development. Mr. Miller is the author of the eight-volume *Network Troubleshooting Library* series of books, published by IDG Books Worldwide, Inc., including *Implementing IPv6* (1998). He is a frequent presenter at industry events, and has taught at ComNet, Computer Telephony Demo/Expo, Comdex, International Communication Association, Networld+Interop, Managing Enterprise Systems and Networks, Next Generation Networks, and other conferences. He holds B.S. and M.S. degrees in electrical engineering, and is a registered professional engineer in four states.

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Dallas, TX	March 24	Fairmont Hotel
Washington, DC	April 6	Sheraton Crystal City
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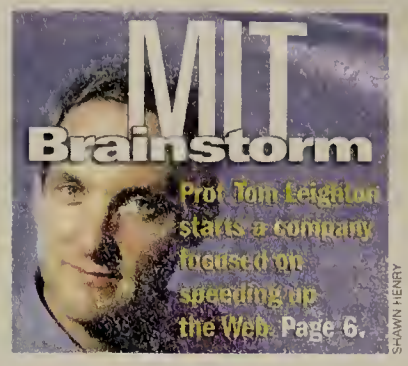

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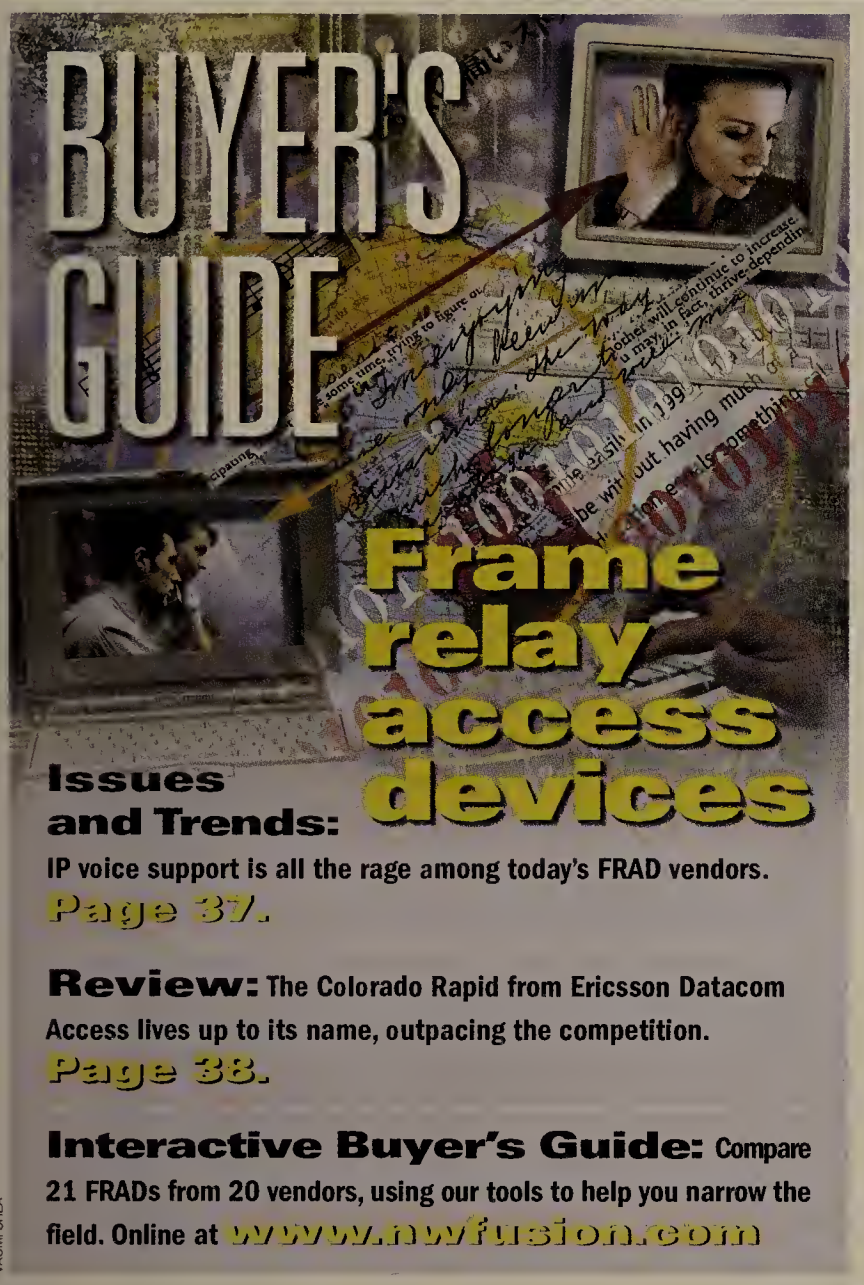


VAOMI SHEA

Ascend deal plugs Lucent ATM leaks

Blockbuster combination could spawn integrated voice, data network services.

By Tim Greene and David Rohde
Murray Hill, N.J.

While the Lucent/Ascend merger last week came as no surprise, the $20 billion deal gives Lucent — the circuit switch king — additional packet and cell technology to satisfy the needs of new carriers looking to offer integrated voice, data and video services.

Without Ascend, Lucent didn't have enough IP and ATM products to entice leading-edge carriers touting IP-everything services, or to beat back the advances of Cisco, which is banging on the doors of Lucent's customers.

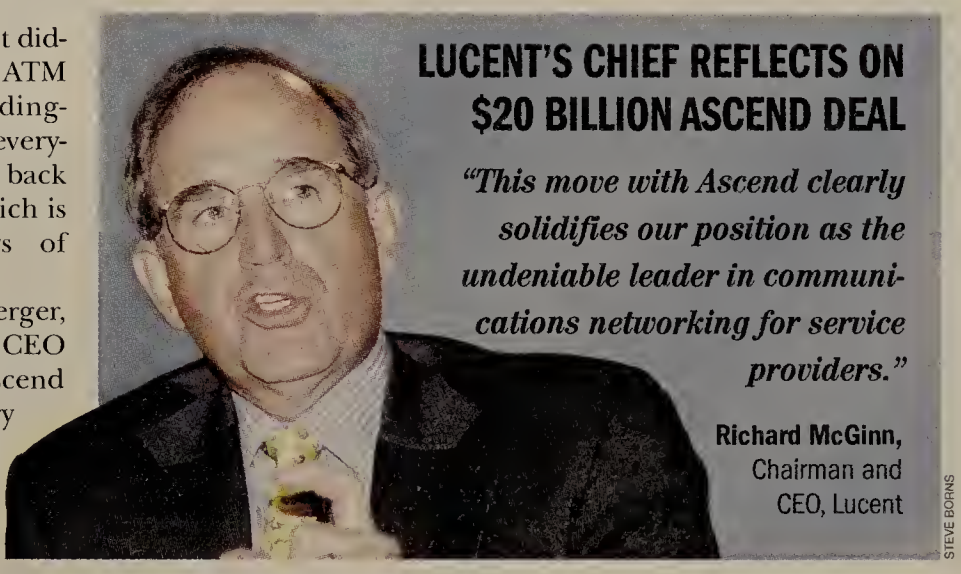
In announcing the merger, Lucent Chairman and CEO Richard McGinn and Ascend President and CEO Mory Ejabat said future carrier networks will support customer services over one unified backbone.

While Lucent has the optical backbone technologies that carriers want, the company lacks an ATM core switch that is as scalable and manageable as Ascend's CX 550. In fact, since last fall, Lucent has been reselling the CX 550.

"Lucent had a really big hole in its product line," says Liza Hendersen, director of consulting for TeleChoice, a Boston consultancy.

"Lucent had a piecemeal approach," agrees Matt Barzowskas, vice president of First Albany, a financial firm in Boston. "It had to make a big move, and Ascend has the

See **Lucent,** *page 60*



STEVE BORNS

Swedish trio touts ATM alternative

By Jeff Caruso

Three Swedish start-ups equipped with a new technology for running voice, video and data over the same line are about to hit U.S. soil.

The technology, called Dynamic synchronous Transfer Mode (DTM), represents an alternative to more established technologies such as ATM switching. The timing of DTM's arrival is good; enterprises and service providers are struggling to find the best way to create multiservice networks for handling data and real-time voice and video traffic.

However, given the head start that ATM and high-speed IP routers have over DTM gear,

See **DTM,** *page 58*

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Two new faces of Linux

SNA development ties Linux to mainframes.

By Robin Schreier Hohman

Code released this week will let Linux users, for the first time, access SNA mainframe resources.

Jay Schulist, the programmer in charge of the open-source Linux SNA project, today is posting Linux tn3270 communications client software on the Linux SNA Project Web site (samba. anu.edu. au/linux-sna/). Linux users will be able to pull data from SNA applications, send it over a TCP/IP backbone and incor-

See **Linux SNA,** *page 59*

Get more online
- Software for linking Linux users to SNA resources.
- Our ongoing Linux vs. NT forum.
- Overviews of plans by other vendors to support Linux.
- Online Linux technical journals.

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Grass-roots effort pulls SGI toward Linux.

By Deni Connor

Silicon Graphics, Inc. (SGI) is proud to talk about how well it supports Windows NT, and likes to boast about the scalability and reliability of its Irix operating system. But the technically savvy workstation and server vendor has said little about Linux.

Meanwhile, programmers inside and outside the company have been banging away, bringing the free, open source operating system to an array of SGI server and workstation

See **SGI,** *page 59*


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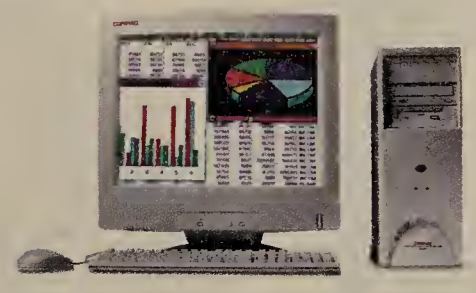

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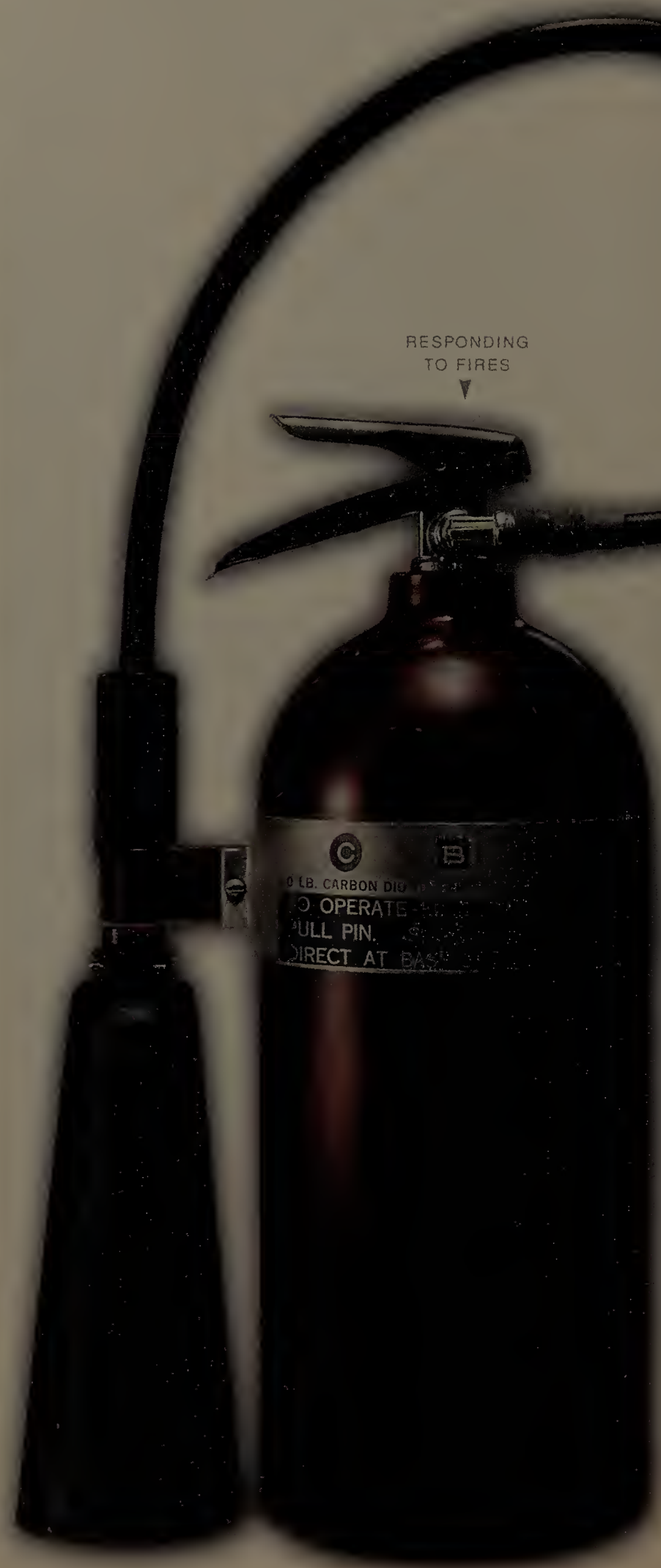

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FIVE SPEED

Cisco announces five new Catalyst 2900 10/100 switches. Page 14.

CALLING ALL WEB SITES

Symbol's new phone lets users browse the Web and make voice calls over a wireless LAN. Page 58.

THE RETRAINING TRACK

Obtaining Windows NT certification allowed Debbi Atkins to switch careers from law enforcement to LAN enforcement. Page 43.

PAUL BUCK

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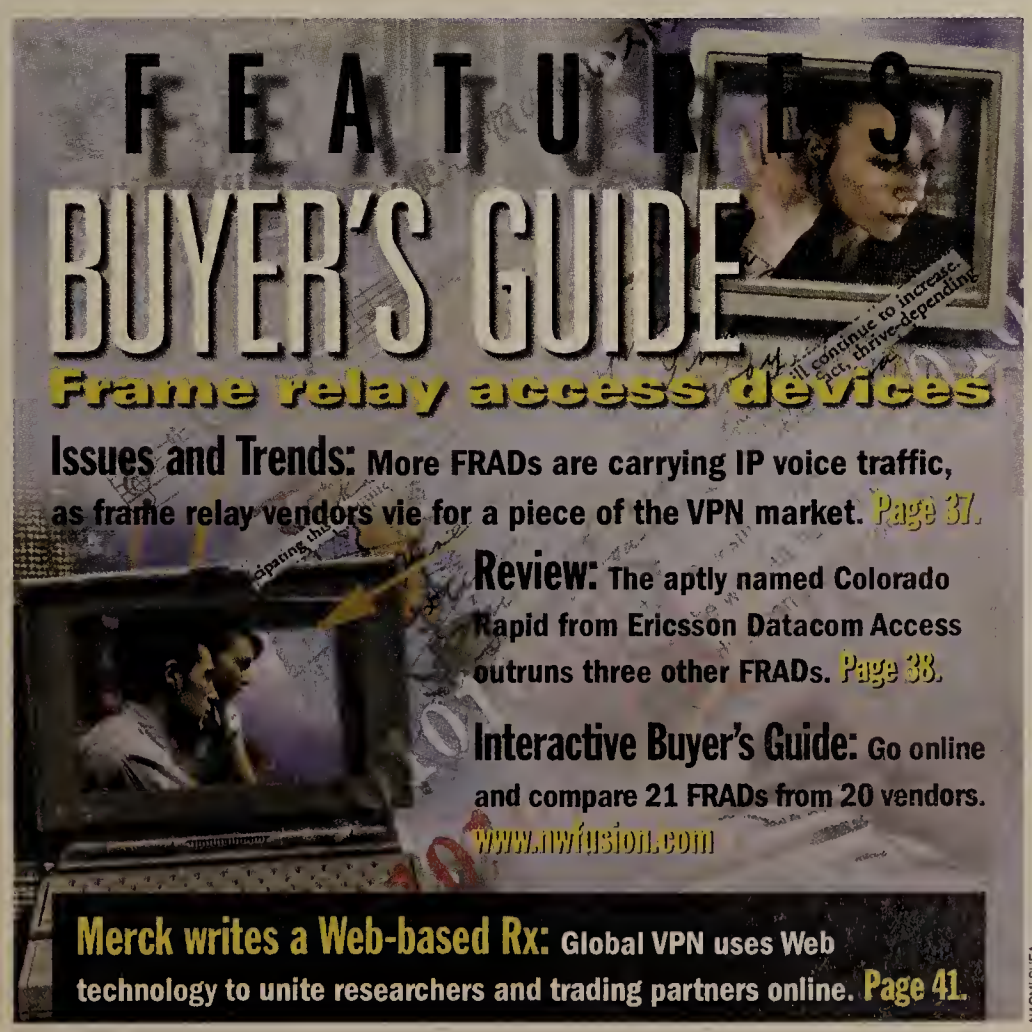
SPECIAL FOCUS

Carrier turf battles

CLECs vs. RBOCs: A nice war? Page 23.

FEATURES



NAOMI SHEA

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This Week

Only on Fusion

Security. Last week's front-page story on net managers exacting revenge on hackers generated a lot of comment. Jump into our cybervigilante forum and take an online poll on how you'd react to somebody breaking into your net. **DocFinder: 1037**

Free Unix. Senior Editor Robin Schreier Hohman recently interviewed Richard Stallman, one of the pioneers of the open-Unix effort. See what he had to say about upstart Linux and other software issues. **DocFinder: 1133**

Water Cooler. Online Senior Writer Sandra Gittlen wonders how many shops are using antiquated software that's just waiting for the right moment to collapse. Look at the U.S. House of Representatives, which saw its e-mail system melt down recently because it was using an old version of Exchange. **DocFinder: 1134**

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News briefs, January 18, 1999

A stamp in time

Just how big was the birth of the PC? We'll soon find out. As part of its "Celebrate the Century" campaign, the U.S. Postal Service is letting the public choose the top events of the century, which will then each be commemorated with a stamp. For the month of February, people can head online (http://stampvote.msn.com/usps/welcome.asp) or to their post offices to vote for 15 out of 30 prospective stamp topics for the 1980s. The PC has some stiff competition, though. Other contenders in the science and technology category are AIDS awareness, the Space Shuttle, gene mapping, CDs and cable TV. Winners will be announced in April, and the 15 1980s stamps will be rolled out next January.

A new venture for Oracle

Oracle last week said it has established a $100 million venture capital fund that will be used to invest in companies developing Oracle 8i Internet products and services. By establishing the fund, Oracle hopes to boost the development of Oracle8i-compliant content management, e-commerce and business intelligence applications. A new group formed within Oracle will manage the fund.

McCaw rebuilds his wireless empire

Wireless communications pioneer Craig McCaw is at it again. Nextlink Communications, one in a stable of new McCaw telecommunications service providers, last week shelled out $695 million for WNP Communications. WNP holds 40 local multipoint distribution service (LMDS) licenses, making it one of the biggest license holders in the country for this new wireless technology. On top of dropping hundreds of millions for WNP, Nextlink last week also acquired Nextel Communications' 50% interest in Nextband, which owns 42 LMDS licenses. Once the two deals are final, Nextlink will be able to offer high-bandwidth LMDS wireless services in 95% of the top 30 metropolitan areas in the U.S.

Nextlink's McCaw *is snapping up telecom companies and distribution licenses.*

Sweet and smart 16

A 16-year-old Irish schoolgirl named Sarah Flannery has been hailed as a cryptographic genius after developing a public-key encryption algorithm that works faster than RSA Data Security technology, which is widely used in software implementations. Flannery, from the city of Cork, developed her idea after a short stint working at Dublin-based public-key infrastructure provider Baltimore Technologies, according to wire service reports. At a press conference in Dublin, Flannery told reporters she has no specific career plans but wants to pursue a university education — away from the press.

Building big underwater net pipes

Global TeleSystems Group and Flag Telecom last week announced a joint venture to build and operate what they say is the first terabit transoceanic network. The $1 billion system will be designed to carry voice, data and video traffic at up to 1.28 terabit/sec — a 25-fold increase over current trans-Atlantic cable system capacity — between Europe and the U.S. Called Flag Atlantic-1, the transoceanic system will have two nodes in Manhattan linking the U.S. to Great Britain and France. Services over the network should begin next year.

Start-up seeks to unclog Web

MIT researchers behind the technology used for global server network.

By Tim Greene
Cambridge, Mass.

When the "father of the World Wide Web" speaks, people listen.

Massachusetts Institute of Technology math professor Tom Leighton did, and now he's chief scientist at Akamai Technologies, an ambitious start-up that promises to make Web sites respond quickly, no matter how many hits they get.

Three years ago, Web pioneer Tim Berners-Lee mentioned to Leighton that somebody should figure out how to distribute Web content on the Internet so it is always available with minimal delay. Leighton, whose MIT office is down the hall from Berners-Lee's, worked on the problem with his technical team and founded Akamai last year to commercialize the technology.

Akamai, which is located in spartan offices across the street from MIT and backed by $8 million in venture funding, calls its debut service FreeFlow.

FreeFlow delivers customers' Web pages via Akamai's global network of distributed Web servers, which currently number 300 and will grow to 1,000 by year-end. Leighton claims FreeFlow prevents Web sites from buckling under a barrage of simultaneous requests for content, such as the Starr Report. CNN says it plans to use FreeFlow for just that reason.

The Akamai network determines where hits are coming from and shifts copies of the pages sought to Akamai servers nearest the source of the demand. When demand drops, the network cuts back on the number of servers delivering content. Customers don't have to add hardware or change Internet access to use the service.

With faster response times, Akamai customers will be able to post more complex pages because they won't have to worry about users getting frustrated while they wait for downloads, according to Paul Sagan, Akamai's chief operating officer. Sagan brings a wealth of Web business expertise to the firm, having been responsible for Time, Inc.'s online activities, including its Pathfinder Web site.

When simply stated, FreeFlow sounds like a caching or mirroring service, but Leighton says the offering is different. Akamai's server network constantly monitors 'Net performance, shifts demand for content and responds by redistributing content accordingly.

The network uses server software based on a blend of four families of algorithms: randomized, online, flow and consistent hashing. The software runs on each server, distributing intelligence around the network so adjustments are made without intervention from a central site, Leighton says. If one server goes down, others become aware and pick up the slack.

Mirroring and caching are more or less static technologies that can provide content from multiple sites, but they can not necessarily do it closer to end users requesting content. Spikes in demand can still overwhelm cached and mirrored sites.

When Akamai starts beta tests of its service this quarter, it will be several months behind Sandpiper Networks, its chief rival in the specialized field. Sandpiper also focuses on Web publishers and companies interested in transacting business over the Web.

Akamai's servers are installed at ISP and carrier points of presence, including those at Exodus Communications. Akamai has simulated peak demand for the Starr Report and run it over the network for weeks without trouble, Leighton claims.

While FreeFlow deals with surges in demand, it also can make downloads faster because its network of servers is closer to more users than a single server could be. As a rule, Akamai delivers content so it has to make as few router hops as possible. However, if the least-hop path is congested, FreeFlow may use a longer route that happens to be faster at that time.

With FreeFlow, customers can monitor, in real time, where hits are coming from and which URLs are being requested.

All customers have to do to use FreeFlow is install software that tags the Web pages customers want Akamai's service to handle. This lets customers choose which pages to turn over to FreeFlow and which to handle directly from their own servers. This is valuable to e-commerce sites where customers might want to freely distribute information about products but keep actual transactions behind a corporate firewall, Sagan says.

Akamai uses off-the-shelf Intel-powered servers running a customized version of Linux. The cost of one of its servers is less than the $25,000 a typical Web server would cost, Leighton says. Akamai declined to give further details.

Akamai has not set its pricing, which will be based on usage and the amount of content customers want FreeFlow to handle. Sagan says the price will be comparable to what it would cost to buy extra Internet access bandwidth to speed up a Web site.

The company is now accepting beta testers.

✆ Akamai: (617) 250-3000

PROFILE: AKAMAI TECHNOLOGIES

Based: Cambridge, Mass.

Founded: 1998

Business: FreeFlow Web service

Key personnel: Chief Operating Officer Paul Sagan, formerly of Pathfinder; MIT mathematicians Tom Leighton and Daniel Lewin

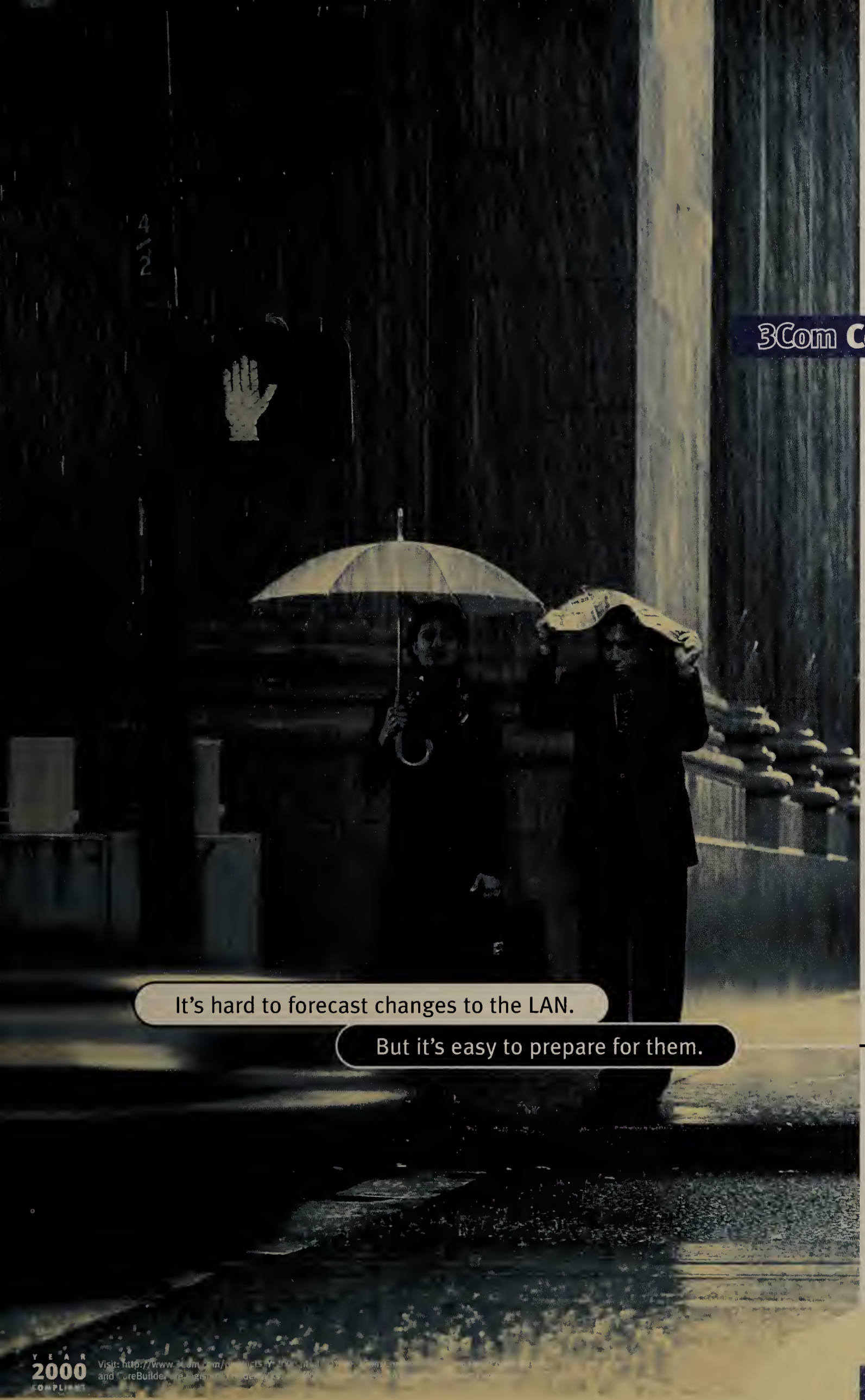
Finances: $8 million from Battery Ventures, Polaris Venture Partners and private investors

Competitor: Sandpiper

Fun fact: Akamai is Hawaiian for intelligent, clever and cool.

SHAWN HENRY

Paul Sagan (seated) and Tom Leighton



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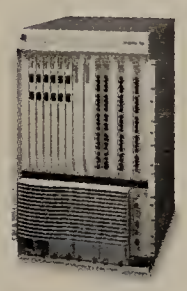

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HP net traffic simulator takes flight

By Jeff Caruso
Palo Alto

To help network managers plan for tomorrow's networks today, Hewlett-Packard this week will introduce software that simulates future traffic conditions.

Using topology information and historical performance data, HP OpenView Service Simulator can assess how response time and performance would be affected if a new application, more bandwidth or additional users were added to a network.

"We have a number of applications we're starting to deploy where we need to figure out what service levels we can expect," says Scott Toborg, senior member of the technical staff at SBC Technology Resources, the Austin, Texas, research subsidiary of SBC Communications.

Toborg plans to use the simulator on SBC's internal network to prepare for the addition of financial, human resources and intranet applications. Currently, SBC has to set up probes throughout the network whenever the company deploys a new application. It also must set up a test network. And predictions still haven't been as accurate as they could be, Toborg says.

HP's software was primarily developed by Washington, D.C.-based MIL 3, Inc., which sells the simulation package under the name IT DecisionGuru. HP helped develop interfaces between MIL 3's offering and HP's management software so the simulator can get data it needs to do its job.

Service Simulator gets topology data from HP OpenView Network Node Manager, a network management platform, and historical performance data from HP's NetMetrix software. Before a user runs a simulation, the tool imports information from these HP products so the simulation incorporates the most up-to-date data.

Users can tune variables to see what the impact of running new network applications will be. With basic data about how an application performs, a user can predict where congestion problems will occur. If the user knows traffic is increasing at a certain rate, the software can predict when the network will begin to fall short of required service levels.

Most network management software lets companies react only to things that go wrong, says Jasmine Noel, an analyst at D.H. Brown Associates of Port Chester, N.Y. Service Simulator "lets you be proactive, but in a capacity-planning kind of way," she says. "For the first time, this is actually easy to do."

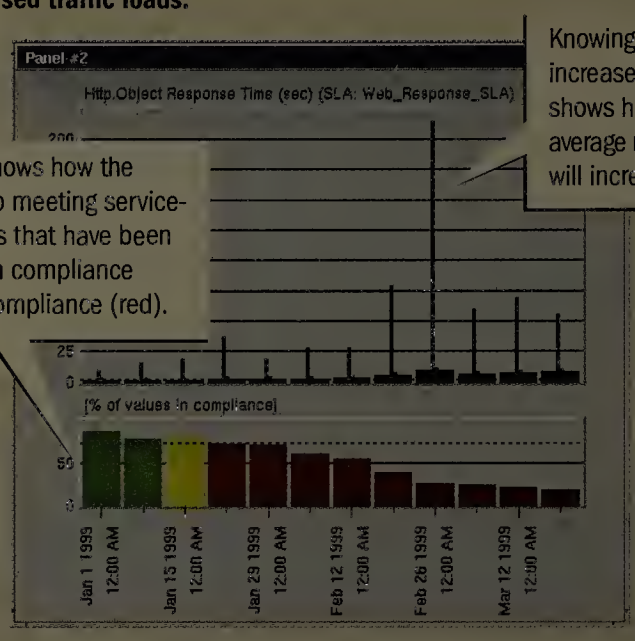
Noel expects other network management vendors to follow suit.

Service Simulator is available now from HP and MIL 3, starting at about $20,000. It runs on HP-UX, Solaris and Windows NT. MIL 3 also offers a version for Windows 95 and 98.

© HP: (800) 452-4844

HP'S CRYSTAL BALL

Using information about a network's current topology and traffic levels, Service Simulator predicts how the network will respond to increased traffic loads.



The simulator shows how the network will stop meeting service-level agreements that have been set, moving from compliance (green) to noncompliance (red).

Knowing that traffic will increase, the simulator shows how peak and average response times will increase.

New security tools debut at RSA show

Products on tap from Hewlett-Packard, Netscape and Tripwire Security.

By Ellen Messmer
San Jose

Once but a love-in for a small number of crypto-weenies, the annual RSA Data Security Conference has blossomed into a tribal gathering where the security industry comes to strut its latest stuff. Here are some of the anticipated RSA '99 show highlights.

Hewlett-Packard will be showing off its latest version of VirtualVault, basically a "hardened" Web server that's been widely adopted by the banking industry for protection against hackers who exploit buffer overflows or launch Common Gateway Interface script attacks.

Costing up to $40,000, VirtualVault 3.5 adds a way to "compartmentalize" Java Virtual Machines and Java servlets, says HP product manager Julie Rockwell. "If someone did break into your server, he wouldn't be able to shut off HTML pages or Java servlets."

HP has a second security product to tout, the Praesidium DomainGuard. With this $3,950 software, users can add technology to a Netscape Web server and a Lightweight Directory Access Protocol (LDAP) directory for authorizing users and determining the files they can view. "You may want your trading partners to see sales force data but not R&D," says David Dorr, an HP product manager.

Netscape also is out to make waves at RSA '99 with new versions of its Directory Server and Certificate Management System, which is used for issuing and managing digital certificates.

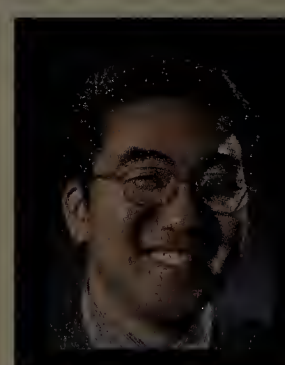
Now shipping, Netscape Director Server 4.0 has a better management interface and will be able to handle 5,000 queries per second, up from 1,000 in the earlier version. It will also support 50 million users, says David Weiden, Netscape's vice president of directory and security. Priced at $2.50 per user, the directory can store each user's passwords and digital certificates.

In the second quarter, Netscape plans to ship Netscape Meta-Directory 1.0. This tool will automatically synchronize user, security and account information related to existing e-mail, enterprise resource planning and flat files. Meta-Directory 1.0 will allow the information to be centrally stored in Netscape's LDAP directory.

Being developed in partnership with Isocor, Meta-Directory will initially support SAP, PeopleSoft, NT and Domain Name System data. The cost is expected to be $3.75 per user.

Also in the second quarter, Netscape will ship Certificate Management System 4.0, which Weiden claims will not issue standard X.509 certificates, but special-purpose certificates used by the Department of Defense and financial institutions. Another new feature of the certificate server is that it will accept Kerberos or SecurID tokens as proof of identity.

Also at RSA '99, expect to hear about intrusion-detection systems; Tripwire, the oldest shareware software of its kind — developed six years ago at Purdue University by researchers Gene Kim and Gene Spafford — is going commercial with Tripwire 1.0



"Tripwire is still available as shareware from Purdue. But with the commercial version from Tripwire Security Systems, we offer full customer support."

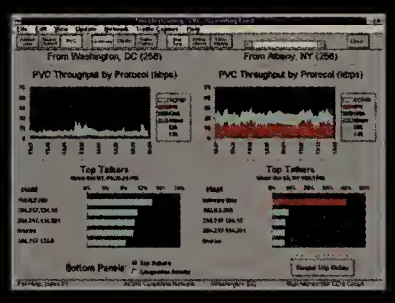
Gene Kim, Tripwire co-developer

Tripwire Security Systems, Inc., a Portland, Ore., start-up founded by CEO Wyatt Starns, will be marketing Tripwire 1.0 for $495. Starns bought the Tripwire rights from Purdue.

"Tripwire is still available as shareware from Purdue," Kim says. "But with the commercial version from Tripwire Security Systems, we offer full customer support." ■

In the dark about frame relay availability?

Make it Visual.



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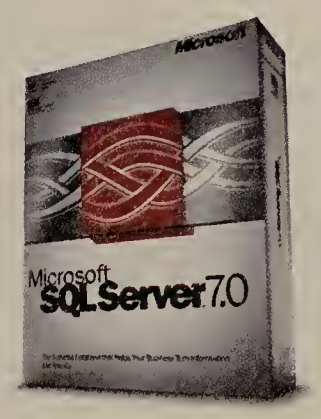

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Banyan bows before mighty Microsoft

By Christine Burns

On the surface, last week's alliance between Banyan Systems and Microsoft is about delivering tools and services that will allow their products to interoperate better. But the real deal, experts say, is that Banyan has conceded its share of the network operating system (NOS) and directory services markets to Microsoft.

Under the terms of the deal, Microsoft will invest $10 million in Banyan's growing network services business and holds the option to buy a 7.5% stake in its former NOS rival. Banyan will use the money to train at least 500 network engineers in designing, deploying and maintaining Microsoft products — namely Windows NT/2000 and Exchange — at large, enterprise customer sites.

Banyan has maintained a loyal high-end customer base with its reliable and scalable VINES NOS and StreetTalk Directory Services. But Banyan has been plagued by recurring financial woes, weak marketing and waning market share.

New corporate directions

The company has been steadily moving away from its software development roots toward network services and support since CEO William Ferry took over the Westborough, Mass., company two years ago.

Ferry says the overwhelming majority — as many as 90% — of Banyan's customers are already using Microsoft products. "And they are telling us to support Windows NT as a future direction," Ferry says, adding that Banyan will move its network to NT as well.

The two companies will first collaborate on connectivity tools that offer better ties between Banyan VINES and NT Server machines. They also will work to integrate StreetTalk with NT 4.0 domains and the yet-to-be-released Windows 2000-based Active Directory. This will be done by enhancing StreetTalk's support for the Lightweight Directory Access Protocol and building a directory synchronization tool. Those products will ship later this year.

Additionally, Banyan will build tools that eventually will help users migrate from VINES and StreetTalk to Windows 2000 and Active Directory. Officials refused to say when Banyan will discontinue development of VINES and StreetTalk.

BANYAN NUMBERS ON THE RISE

Since early November, Banyan's stock price has more than quadrupled.

SOURCE: NASDAQ

Users were not surprised by Banyan's Microsoft allegiance.

"The end of VINES and StreetTalk was going to be a given once Microsoft was able to get Windows 2000 out there and established as a stable product," says Ted Kull, a network manager with longtime Banyan user Educational Testing Services (ETS) in Princeton, N.J.

While Banyan gets a much-needed cash infusion, Kull asserts that Microsoft is also benefiting from the deal. "Microsoft gets a leg up on migrating Banyan's existing client base to its own products. Everyone thinks of Banyan as a nonplayer, but when you look at the quality of its customer base, you can see the company has a very attractive customer list," he says.

Bailing out Active Directory?

Industry observers say Microsoft is looking for more from Banyan than integration tools.

"This raises a red flag about the readiness of Active Directory," says Jon Olsten, an analyst with the Cambridge, Mass., consultancy Forrester Research Group. "It looks to me like Microsoft has found a quick and cheap way to get its hands on whatever pieces of StreetTalk it needs to get Active Directory out the door."

Microsoft officials say the deal does not include a technology exchange, but note they would not rule that out in the future.

✆ Banyan: (508) 898-1000

New Dell server is fast and inexpensive

Low-end PowerEdge 1300 server starts at less than $2,000.

By Deni Connor

It used to be that you could not even get a decent desktop for less than $2,000, never mind an adequate server.

Nowadays, that kind of dough will get you a PC server with oodles of capacity, at least for smaller operations.

Dell this week will give frugal customers another choice: the PowerEdge 1300, a $1,699 server aimed at enterprise workgroups or small and mid-size businesses.

The base PowerEdge 1300 has a 350-MHz Pentium II processor and 512K bytes of cache. It can be equipped with up to 1G byte of memory, 54G bytes of storage and a 450-MHz processor. The server, which fills out the low end of the Dell line, is intended for operations that may currently be using a desktop machine as a server for file and print, fax or messaging functions.

DELL POWEREDGE 1300

The new server features:

- 350-MHz to 450-MHz Pentium II processors
- 512K bytes of cache
- 64M bytes to 1G byte of memory
- 4G to 54G bytes of storage
- An Intel Pro+ 100M bit/sec Ethernet adapter

"It is an excellent alternative to pressing a PC or white box into service as a server," says Jerry Sheridan, director of client/server computing for Dataquest in San Jose.

The 1300 has an Intel Pro+ 100M bit/sec Ethernet adapter and ships with Hewlett-Packard's OpenView Network Node Manager and HP's ManageX for systems, network and applications management. In addition, the 1300 includes Microsoft's Small Business Server, a low-end version of BackOffice designed for operations that may not have a dedicated network manager. Dell also plans to offer onsite installation and configuration services options to PowerEdge 1300 customers.

Fifty percent of server customers are of the type targeted by this server, according to International Data Corp. (IDC) of Framingham, Mass. "The PowerEdge 1300 doesn't add as many of the availability features you would find in its predecessor, the PowerEdge 2300. This reduces the 1300's cost significantly, and Dell has geared it to specific functions for small workgroups of 20 people or so," says Amir Ahari, senior analyst at IDC.

"The 1300 is very affordable for a server and offers more than a glorified workstation. It can be used in areas that require memory expansion, a high-speed network adapter and high-availability," adds John Atkinson, director of infrastructure at NextCard, an online banking company in San Francisco. "If we can get our hands on one, I plan to use it for small Web servers."

The Dell PowerEdge 1300 is available now, and costs $1,699 for a 350-MHz version with 64M bytes of memory, 512M bytes of cache, an Ethernet adapter, 4G bytes of storage and Microsoft's Small Business Server.

✆ Dell: (800) 999-3355

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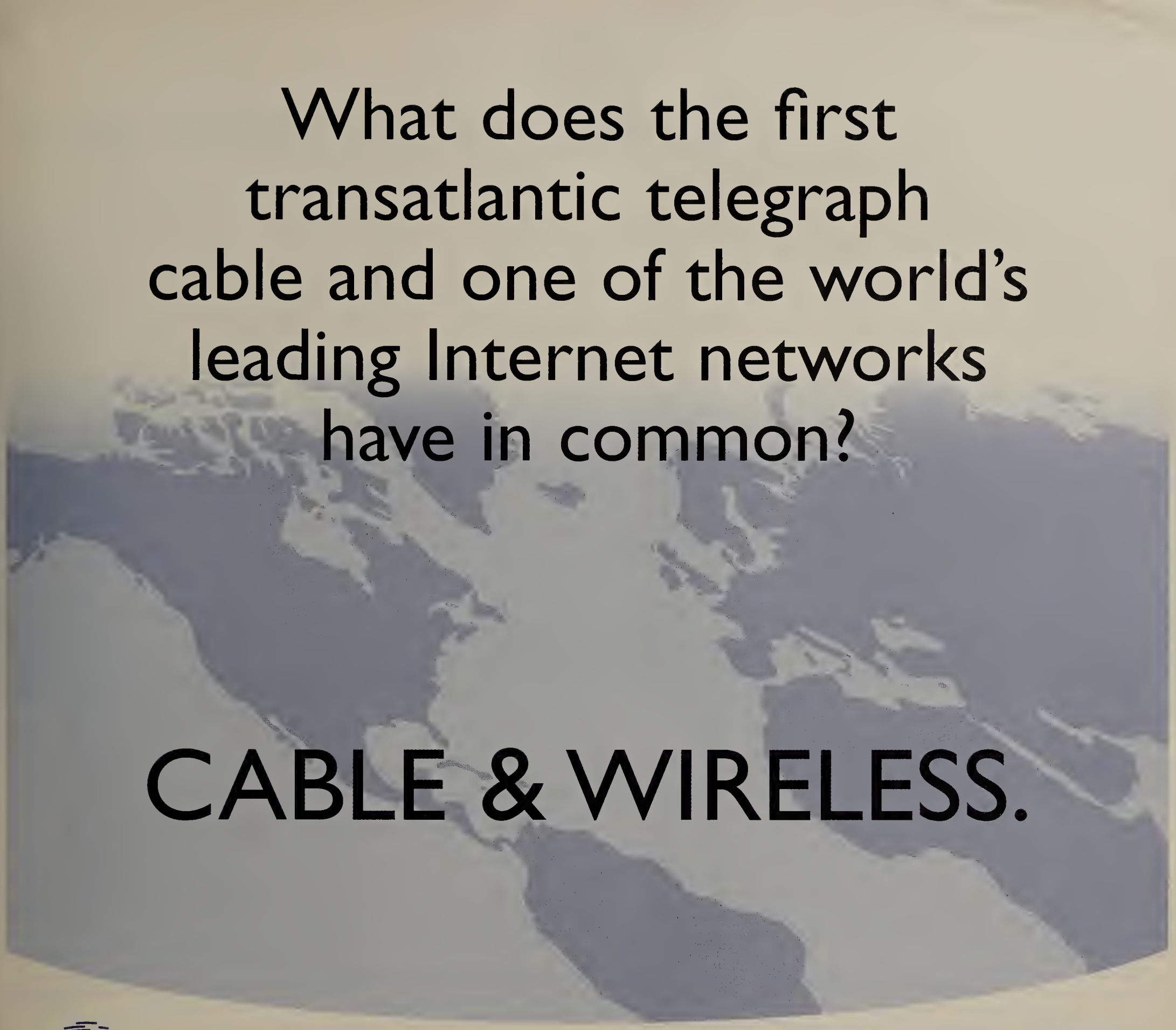

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THE MICROSOFT DIARIES

Week Eleven

The Microsoft-DOJ Trial

MONDAY, JAN. 11

How much does it cost to buy Windows nowadays? We're not likely to find out any time soon. Judge Thomas Penfield Jackson agreed to Microsoft's request to close the courtroom doors while evidence of what the firm charges PC makers for the right to bundle Windows with their hardware was heard. Neither Microsoft nor partners Dell and Compaq wanted the numbers or how they negotiated the licensing deals made public.

A consumer research group released a report claiming Microsoft has overcharged Windows users $10 billion in the past several years. The Consumer Federation of America says that Microsoft has forced users to pay $35 to $45 more per copy than the Windows package is worth because the company enjoys a monopoly. Microsoft shrugged off that assertion, saying Windows prices have remained relatively flat since 1990.

TUESDAY, JAN. 12

U.S. Department of Justice Lawyer David Boies gingerly walked his final witness — economist Franklin Fisher — through his final day of testimony today. Boies coaxed Fisher to touch on the strongest arguments the government has presented against Microsoft over the past three months.

AP PHOTO

Govt. lawyer *Boies rests govt. case.*

Fisher concluded his testimony by saying Microsoft has used its monopoly power to protect itself from threats that may or may not materialize and that this move has hurt consumer choice

WEDNESDAY, JAN. 13

The government wrapped up the prosecution portion of the trial today, but not before taking a few final jabs at Microsoft CEO Bill Gates. One thousand pages of company e-mail and transcripts of Gates' videotaped deposition seemingly catch the CEO in a series of misstatements. The combination leaves doubts about how deeply Gates himself was involved in the plot to force Netscape out of the Internet browser market.

Next to the Gates videotapes, the testimony of Microsoft's first defense witness — Richard Schmalensee, dean of Massachusetts Institute of Technology's business school — was a bit anticlimatic. He said he doesn't consider the Intel-based operating system market to be the only one in which Microsoft must compete. Windows is also threatened by cross-platform technologies such as Java.

THURSDAY, JAN. 14

The government's lead lawyer backed Microsoft's lead witness into a corner today and poked a hole in the basic premise that Microsoft faces operating system threats from all directions. Economist Schmalensee presented a flashy chart that listed technologies from Apple, Corel, Netscape, Oracle, Red Hat Software and Sun, all of which he sees as a threat to Windows. He even had a couple of question marks on the chart to represent future, unknown threats to Windows.

Citing Netscape as an example, Schmalensee argued "it is a characteristic of the business" that software developers can "come out of nowhere."

But that chart was no use after Boies got Schmalensee to admit that Microsoft does not currently face a threat from any of these alternative operating systems because they don't have enough applications to be an effective competitor to Windows on the desktop.

— Christine Burns

LAN trio pops switching wares

Cisco, 3Com and Cabletron augment Ethernet, token-ring offerings.

By Jim Duffy
Framingham, Mass.

Last week, three internetworking giants announced extensions to their LAN switches.

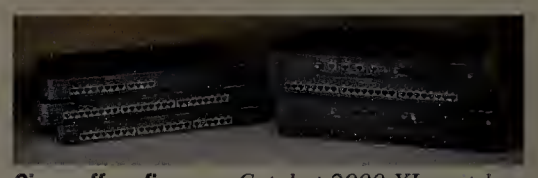
Cisco rolled out new switches that let users construct high-speed LANs for about $100 per port. Cabletron unveiled a switching module that enables users to migrate from token ring to Ethernet, and 3Com unwrapped software that supports quality of service (QoS) for multimedia applications.

Cisco unveiled five 12- and 24-port additions to its Catalyst 2900 XL line of 10/100M bit/sec autosensing desktop switches. The new switches include a 24-port device, priced at $104 per port and among the least expensive in the market, according to Bill Rossi, director of marketing for Cisco's Small Internetworks business unit.

"Compared to a lot of the other brands, they do much more and they're right in the price range with lower-end switches," says Guy Goldstone, engineering consultant at Harbor Court Hotel in Baltimore. "I use them all the time instead of hubs because they're so inexpensive."

The switches support two separate software packages. Cisco's Standard Edition package adds Fast EtherChannel technology, Web-based management and software that can be upgraded to the switches. Fast EtherChannel allows users to combine four physical 100M bit/sec links into a logical 400M bit/sec, full-duplex trunk.

Enterprise Edition, the other software package, adds IEEE 802.1Q or Cisco's proprietary InterSwitch Link (ISL) virtual LAN trunking protocols to the switches, as well as IEEE 802.1p traffic prioritization, Cisco says. ISL and 802.1Q tag packets with VLAN identifiers so traffic reaches its appropriate destination.



Cisco offers five new *Catalyst 2900 XL switches, and touts aggressive per-port pricing.*

Pricing for the five switches starts at $1,795. The Fast Ethernet ISL/802.1Q-capable modules start at $995. These products are available now.

Cisco will ship a $995 Gigabit Ethernet module for the 2900 XL in March. An ATM module will ship in April and will costs $3,495.

Cabletron's token effort

While Cisco augments its Ethernet arsenal, rival Cabletron is polishing up its token-ring offerings.

The company unveiled a token-ring module for its SmartSwitch 9000 chassis that provides "translational" switching between token-ring and other media, such as Fast Ethernet, Gigabit Ethernet, FDDI and ATM.

"We're doing a low migration to Ethernet as budgets and moneys allow," says Jeff Litterick, communications network analyst for the state of South Dakota. "Traffic across our backbone has to be translated to Fast Ethernet from token ring, and then back to token ring on the end."

The 9T428-16 Token Ring SmartSwitch module provides 16 4M/16M bit/sec full-duplex fiber ports. It is available now for $19,995.

Priority free from 3Com

3Com, meanwhile, is offering its new 802.1p switching software for free. The software, Version 2.0 of the company's SuperStack II 3300 and 1100 package, also supports 802.1Q VLAN tagging and link aggregation for combining multiple 100M bit/sec links into a logical high-speed trunk.

3Com says its software allows SuperStack II 3300 and 1100 switch users to assign priority levels for real-time data, voice and video traffic, such as Microsoft's NetMeeting application. Indeed, Microsoft publicly endorsed 3Com's priority QoS capability and policy networking initiative in general.

3Com's software is available now.

✆ Cisco: (408) 526-4000; Cabletron: (603) 332-9400; 3Com: (408) 326-5000

Changes ahead for MCI data customers

By Denise Pappalardo

MCI WorldCom is preparing to move a group of former MCI data service customers onto a different Internet backbone — a shift that could have benefits and drawbacks for customers.

The customers in question are ATM and frame relay users with dedicated permanent virtual circuits (PVC) to what was MCI's Internet backbone. MCI WorldCom plans to move these customers to its UUNET backbone.

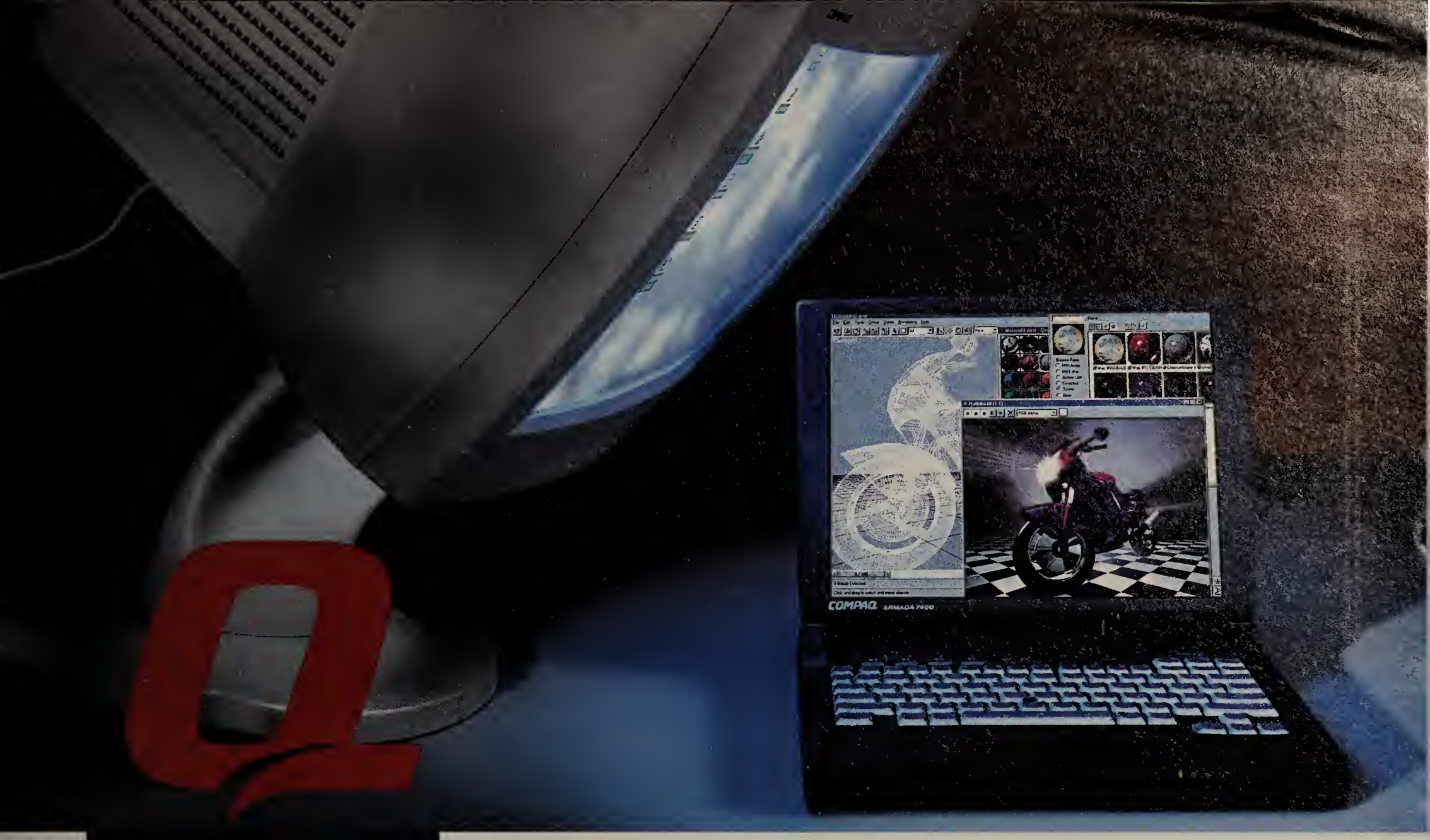
It's not uncommon for business users to skim off a PVC from their ATM or frame relay connections to access their carrier's Internet backbone. Doing so can simplify network management by reducing the number of firewalls and access controls that an administrator needs to support, says Rosemary Cochran, a principal at consulting firm Vertical Systems Group.

One benefit of moving to UUNET's network is that it reaches farther than any other such Internet backbone in the country. UUNET also boasts stronger service-level guarantees than any other ISP.

But customers would need to watch out for having the IP addresses changed on their routers and other network edge devices. They'd also have to be wary about whether their traffic would go through extra router hops to reach the Internet and what sort of Internet exchange agreements UUNET has with other ISPs, says Dan Merriman, vice president at Giga Information Group, a Cambridge, Mass., consulting firm.

Although MCI WorldCom would not comment on the

See **MCI WorldCom**, *page 59*



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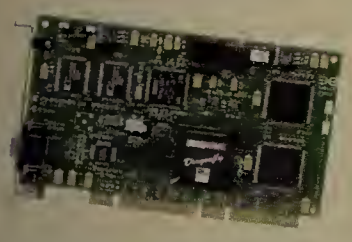
Briefs

■ **Emulex** *last week unveiled a PCI-based Fibre Channel host bus adapter, the LightPulse LP8000. The adapter is intended to increase* **storage-area network** *performance.*



Emulex's LP8000 *speeds up storage-area networks.*

In full-duplex mode, the LP8000 transfers data between servers and storage devices at 150M bytes/sec and is capable of sustaining throughput of 200M bytes/sec over a single Fibre Channel connection.

The adapter fits into a Pentium II Xeon-based server and supports drivers for Windows NT, Solaris, AIX, UnixWare and NetWare networks. It costs $795.

✆ Emulex: (800) 854-7112

■ **NSI Software** *last week introduced a new version of its* **data replication and server failover software** *that runs on Solaris machines and features new capabilities for Windows NT networks, including support for Microsoft Cluster Server.*

Double-Take 3.0, which also runs on NetWare networks, starts at $1,495 per server.

✆ NSI Software: (201) 656-2121

■ **Intel** *last week announced its next-generation microprocessor, code-named Katmai, will be called* **Pentium III.**

Intel also said the brand name for the version of the processor aimed at the server and workstation markets will be Pentium III Xeon.

The first two iterations of the long-awaited processor series will run at 450 MHz and 500 MHz.

Pentium III is scheduled to be introduced late this quarter.

In-Site: *Lessons from leading users*

Goodbye token ring, hello Ethernet

By Marc Songini
Charlotte, N.C.

Making the move from token ring to Ethernet? If so, go as far as you can as fast as you can.

That's the advice from Equitable Life Assurance Society's IT staff, which recently finished moving the company's service organization from a shared 4/16M bit/sec token-ring environment to a switched 10/100M bit/sec Ethernet network.

The company had been considering moving away from its 800-user token-ring network for several years. The time seemed right when the company decided to upgrade its desktop and server platforms and consolidate its service organization at a new site here.

The migration project, which involved grouping three service centers into one, has cost the company more than $1 million.

Given that the network can now speed traffic along five to 50 times faster, Equitable figures the project will pay off in increased productivity and the ability to support expanded workflow and imaging applications.

Because it was moving to a new site, Equitable ditched most of its token-ring gear, some of which was 10 years old and fully depreciated.

"Token ring has been fading because Ethernet is simpler, has higher bandwidth and has been less expensive to deliver," says Charles Sokolski, managing director of IT operations and infrastructure at Equitable. And besides, "we had a clean slate," he says.

Equitable received vendor proposals for its new network by the summer of 1997 and picked Cisco as its primary network equipment supplier that fall. The key device in the Equitable network is the Catalyst 5500 switch, which can be used in wiring closets and to anchor backbone networks. The Catalyst 5500 can also handle Ethernet and token-ring traffic.

By May 1998, Equitable was installing desktop machines in Charlotte, and the company was able to start up its new network during two weekends in July.

The Charlotte network consists of 45 NT, OS/2 and Unix servers, 10 Catalyst 5500s and a pair of Cisco 7513 routers. Currently, there are about 150 token-ring workstations on the network, which is home to more than 800 desktops servicing 650 users.

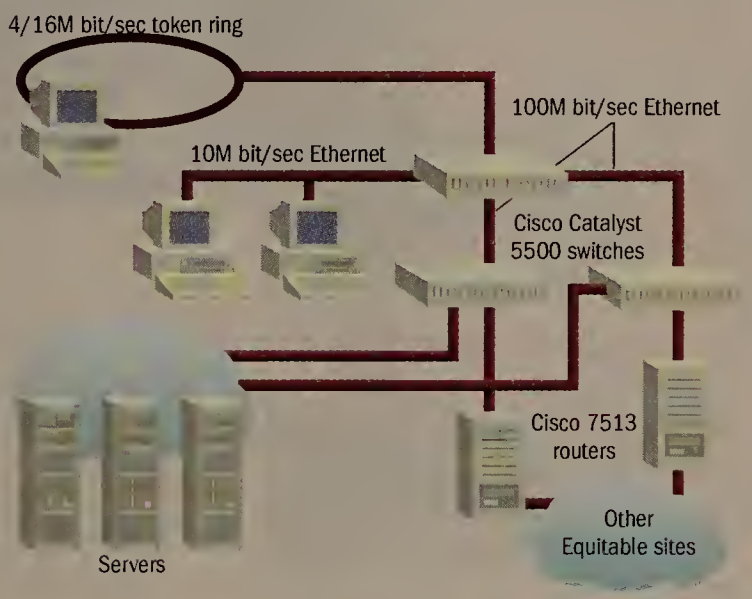
The company has experienced a few bugs translating between token-ring and Ethernet traffic, but no "show stoppers," Sokolski says.

Traffic is transported between the 5500s using Cisco's Inter Switch Link (ISL) tagging protocol, which encapsulates Ethernet and token-ring frames over Fast Ethernet. Frames can then be translated from Ethernet to token ring, or vice versa, by the 7513 routers.

"ISL is the key to a media-independent backbone — one that simultaneously supports both token-ring and Ethernet frames," says Frank Whitten, a Cisco product manager who worked on the Equitable project. "Since the technology is based on Ethernet, when Equitable is finished with its migration, it is left with an Ethernet backbone and uplinks." ■

EQUITABLE DISTRIBUTION

Equitable Life Assurance Society has installed a Cisco-based network to support new Ethernet desktops and servers and existing token-ring desktops. The actual network features 10 switches and hundreds of desktops.



Micron tops off server line

NetFrame 9200 designed for data centers.

By Deni Connor

Micron Electronics last week introduced a top-of-the-line server for mid-size companies that is designed to handle data center duties.

The product helps round out a product line that consists of entry-level, workgroup and departmental servers.

The NetFrame 9200 has four 450-MHz Pentium II Xeon processors, up to 2M bytes of Level 2 cache and addresses up to 8G bytes of RAM. It has redundant, hot-swappable operating system boot drives, power supplies, cooling fans and PCI slots.

The rack-mounted machine, which supports up to 2.1T bytes of external storage, ships with Windows NT Server 4.0, Novell NetWare 4.11 or 5.0, or with no network operating system installed. The server ships with an Intel Pro/100+ Server Adapter for Fast Ethernet connectivity.

The 9200 is priced starting at $14,199 for a single-processor configuration with 512K bytes of Level 2 cache, 256M bytes of RAM, two 4G-byte hot-swappable boot drives and a 10-user Windows NT Server 4.0 license.

Micron is making "a very compelling proposition" with an NT server priced this low, says James Gruener, senior analyst of NT Servers at Aberdeen Group in Boston. Micron is developing a loyal following by selling directly to mid-size firms and making it easy to order systems, he says.

✆ Micron: (800) 249-1179

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WIRED WINDOWS

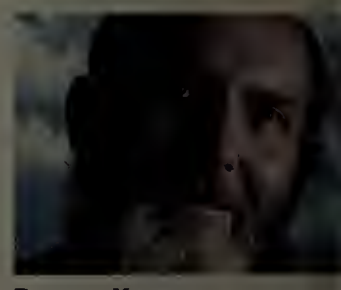
Stuck on the Microsoft trial

I have been a fan of television courtroom drama for many years, so it comes as no surprise that I've been watching the Department of Justice vs. Microsoft antitrust trial and imagining it as a TV show.

Halfway through the proceedings, I'm torn as to how to characterize the players in this drama, especially Microsoft's lawyers. Bill Neukom, John Warden and especially lead questioner Michael Lacovara appear to go out of their way to alienate and insult the press, the public, the government witnesses and especially Judge Thomas Penfield Jackson. A couple of examples will illustrate what I mean.

First, after the announcement of the purchase of Netscape by America Online, many industry analysts reported the deal as a win for Microsoft (*NW*, Dec. 7, 1998, page 24). Yet Microsoft's spokespeople repeatedly tried to paint it as a sign that competition was alive and well. When Judge Jackson said the deal would likely impact the case, Neukom et al. began dancing in the street — convinced, they said, that the judge would now rule in their favor, and perhaps even dismiss the case. Instead, Judge Jackson took pains to introduce into evidence (a rare move for any judge) a news report of an interview with AOL's Steve Case, which strongly bolstered the government's contentions about Microsoft's monopoly powers.

Second, Lacovara has almost continuously drawn warnings from Judge Jackson about the length, scope and demeanor of his cross-examination of government witnesses. For example, rather than questioning final government witness Franklin Fisher about the economics of the marketplace — Fisher's area of expertise — Lacovara kept asking him questions about the inner workings of Java. The lawyer could have asked those questions of Sun's James Gosling, the man who created Java, but instead asked him about economics!



Dave Kearns

If this were a fictional trial, the tactics of Microsoft's lawyers would already have drawn contempt citations from the judge. Here in the real world that probably won't happen, but it will likely bring them a loss in this case. And it's a case Microsoft could have easily stopped with a consent decree heavy on platitudes while short on any actions that would hamper Bill Gates' software empire. How could Microsoft get to be that rich and yet be that dumb?

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at wired@vquill.com.

Tip of the week

NetBasic vendor HiTecSoft has released WebConsole for NT, which allows network administrators to manage their entire NT and NetWare environments with a browser.

The product includes a performance monitor, scheduler, service manager and device manager, as well as remote control, shared resource management, software inventory control and a system policy editor. There's a whole lot more, but see for yourself at www.hitecsoft.com.

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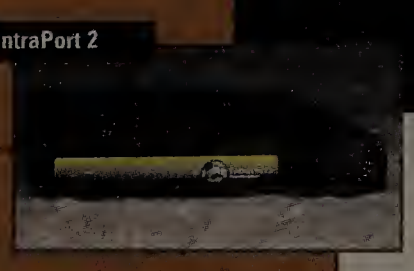
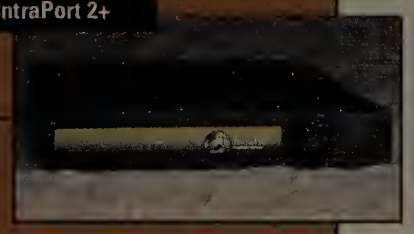


For medium-sized businesses or large branch offices that need up to 200 simultaneous remote access sessions and/or up to 32 site-to-site connections.

IntraPort 2+



Designed for large central sites that need scalability up to 40,000 simultaneous remote access sessions and/or up to 512 site-to-site connections.

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Briefs

■ **Cisco** *has unveiled a* **cable broadband access product** *that will support integrated data, voice and video.*

The Cisco universal broadband router uBR924 combines a traditional cable modem and an access router in one package.

The uBR924 is designed for small office/home office workers, telecommuters and educational institutions that intend to support an integrated data, voice and video cable network infrastructure.

The Cisco uBR924 includes two voice ports, four data ports and a cable port.

The device costs $1,000 and will ship in the second quarter.

✆ Cisco: (408) 526-4000

■ **Interlink Computer Sciences** *last week warned investors that the company will* **report lower than expected revenue** *and a $1.9 million loss in the second quarter ended Dec. 31, 1998.*

Interlink sells software that ties TCP/IP networks to IBM System /390 and SNA networks.

Analysts expected a $500,000 loss on revenue of about $7.5 million.

■ *Remote access gear provider* **Perle Systems** *last week announced the Perle 594T Network Controller, which will let* **Ethernet and token-ring users connect to an IBM AS/400** *server over an IP backbone.*

The 594T can tie up to 80 LAN desktops to an AS/400 server.

As an option, the Perle 594T can be equipped with an IP routing feature, avoiding the expense of adding and configuring an external router.

Pricing for the Perle 594T starts at $2,995.

✆ Perle: (800) 467-3753

Sonoma has eye on enterprise prize

Total Access Partners Program will market ATM hardware to corporate network managers.

By Tim Greene
Marina del Ray, Calif.

Sonoma Systems' ATM gear isn't just for carriers anymore.

The company recently launched a program to sell its ATM Sonoma Access concentrator to enterprises, enabling users to put all corporate traffic — voice and data — onto a single ATM WAN link.

The company's Total Access Partners Program (TAPP) is intended to attract resellers that will market Sonoma hardware to corporate network managers.

TAPP will allow Sonoma to get its concentrator installed in enterprise networks without expanding its sales force. The sales force will continue to focus on carriers, according to a company spokesman.

In conjunction with TAPP, Sonoma is releasing voice cards for the Sonoma Access chassis. The voice feature lets corporations save money by dumping voice and data onto a single wide-area link instead of paying for multiple dedicated lines.

The cards support up to four DS-1 ports on a single Access chassis.

ATM cell switching blends voice and data onto a single line without dedicating bandwidth to specific applications, unlike traditional time-division multiplexing. As a result, cell switching makes better use of bandwidth, minimizing the size of the links a corporation has to buy.

Considerations

A potential downside is that users have to take responsibility for managing the gear rather than buying a managed service from a carrier, says David Passmore, president of NetReference, a consultancy in Sterling, Va. A managed service is simpler for users because carriers control the box, and customers simply plug their LANs and PBXs into it.

However, letting carriers manage the box costs more.

"The decision is based on economics and whether it is cheaper to lease than to buy," Passmore says.

At $10,000 to $15,000, depending on configuration, the box is relatively inexpensive.

User training is another potential concern. "It's not a huge learning experience, but the customer does have to learn a little bit about ATM, especially when it comes to trouble-shooting," Passmore says.

Sonoma customers connect LAN and PBX traffic to the Access box, which sends the traffic to a carrier that offers ATM access to voice and data services.

Sonoma Access has to be configured to prioritize traffic and drop it on the correct permanent virtual circuits. The carrier would be responsible for the rest. If trouble arises, customers have to team with the carrier to pinpoint the problem.

See **Sonoma**, *page 20*

Switching start-up reinvents itself

By Bob Brown
Framingham, Mass.

BlazeNet, we hardly knew you.

The start-up introduced itself and its AppSwitch 2000 LAN and WAN routing switch at last spring's NetWorld+ Interop '98 conference, but has been in hibernation since (*NW*, April 13, 1998, page 6).

It turns out that BlazeNet had a tough time freezing the feature set on its switch and did not stick to its schedule of starting beta-testing last May to begin shipping the product by year-end.

The firm had other problems, including the fact that it had to settle for blaze-net.com as its URL rather than blazenet.com, which was already taken by an Internet company.

Now the firm, renamed Top Layer Networks, Inc., is scheduled to reintroduce itself next month. Top Layer plans to have AppSwitch 2000 in beta testers' hands by the end of this month and expects to ship the product in the spring. The firm says it has a backlog of announcements to make on topics such as new venture funding and a marketing message focused on what the company calls Layer 7 switching.

The name Top Layer is a reference to AppSwitch 2000's ability to exploit the seventh and top layer — the application layer — of the Open Systems Interconnection model.

Top Layer has developed Application Specific Integrated Circuit technology that enables the company's switch to look at the first 128 bytes of each frame and make routing decisions based on the information examined, says Bruce Lynskey, the firm's new vice president of marketing. This will enable the switch, for example, to give a user making an online transaction priority over someone browsing the World Wide Web, he says.

Lynskey says Top Layer's device goes further than products marketed as Layer 4 switches, which prioritize traffic based simply on traffic type, such as e-mail or HTTP.

Top Layer's 14-port switch will come in six configurations, and a WAN module will be optional. The firm will eventually offer its technology in components that can fit into other vendors' boxes, Lynskey says.

Top Layer foresees customers plopping down its boxes in front of routers, where AppSwitch 2000s can help prioritize traffic before it goes to the WAN. The boxes could also be used between wiring closets and backbones and between wiring closets and server farms, he says.

Despite the delay, the technology could prove attractive to customers, one analyst says.

"They're taking an approach that other equipment suppliers will have to follow: put sufficient intelligence into the box so that it makes life simple for the network manager," says David Dines, an analyst at Aberdeen Group in Boston. ■

PROFILE: TOP LAYER NETWORKS (FORMERLY BLAZENET)

Headquarters: Framingham, Mass. (moving down the road to Westborough, Mass., soon)

Founded: January 1997 by former Digital employees

Primary product: AppSwitch 2000, a LAN and WAN switch that routes traffic by looking deep inside frames

Management: Bruce Cohen, CEO and president

Employees: 40

Funding: $2.5 million in first-round funding from Egan-Managed Capital, Hambrecht & Quist, and Texas Instruments Venture Partners; Top Layer soon plans to announce a second round of funding.

Fun fact: BlazeNet's mascot had been a blue firefly named Blaze, but Top Layer is squashing the bug as part of its new image.

Platinum software predicts effects of batch jobs

By Jeff Caruso
Oakbrook Terrace, Ill.

Platinum Technology has unveiled a software tool to help IT managers foresee how large text flows, called batch jobs, will affect system performance.

Platinum's AutoSys/JobVision software will provide a way for IT managers to visualize how batch jobs, running on various enterprise systems, are dependent on each other. With this knowledge, managers will be able to better schedule the jobs.

E and L Transport previously ran its batch jobs in a small test network, then "put them in production and hoped for the best," says Jerry Burgen, systems administrator for the company.

With a beta version of AutoSys/JobVision, E and L Transport has been able to better predict how a new job will affect other systems. The Wayne, Mich., company transports cars for the big auto makers. The company runs batch jobs to update its orders and invoices, and back up databases.

See interactions

Network managers can use AutoSys/JobVision to edit individual jobs and see how the jobs interact with one another, all from a graphical interface. Jobs are depicted in a flowchart. Managers can simultaneously apply changes to jobs across platforms and use job templates to create new jobs.

The software is part of Platinum's ProVision enterprise management software suite, which monitors networks, applications, desktops and servers and helps managers solve performance problems.

AutoSys/JobVision is shipping now for Unix, Windows NT and OS/390 platforms running Sybase, Oracle or Microsoft SQL Server databases. Pricing starts at $15,000 per server.

✆ Platinum: (800) 442-6861

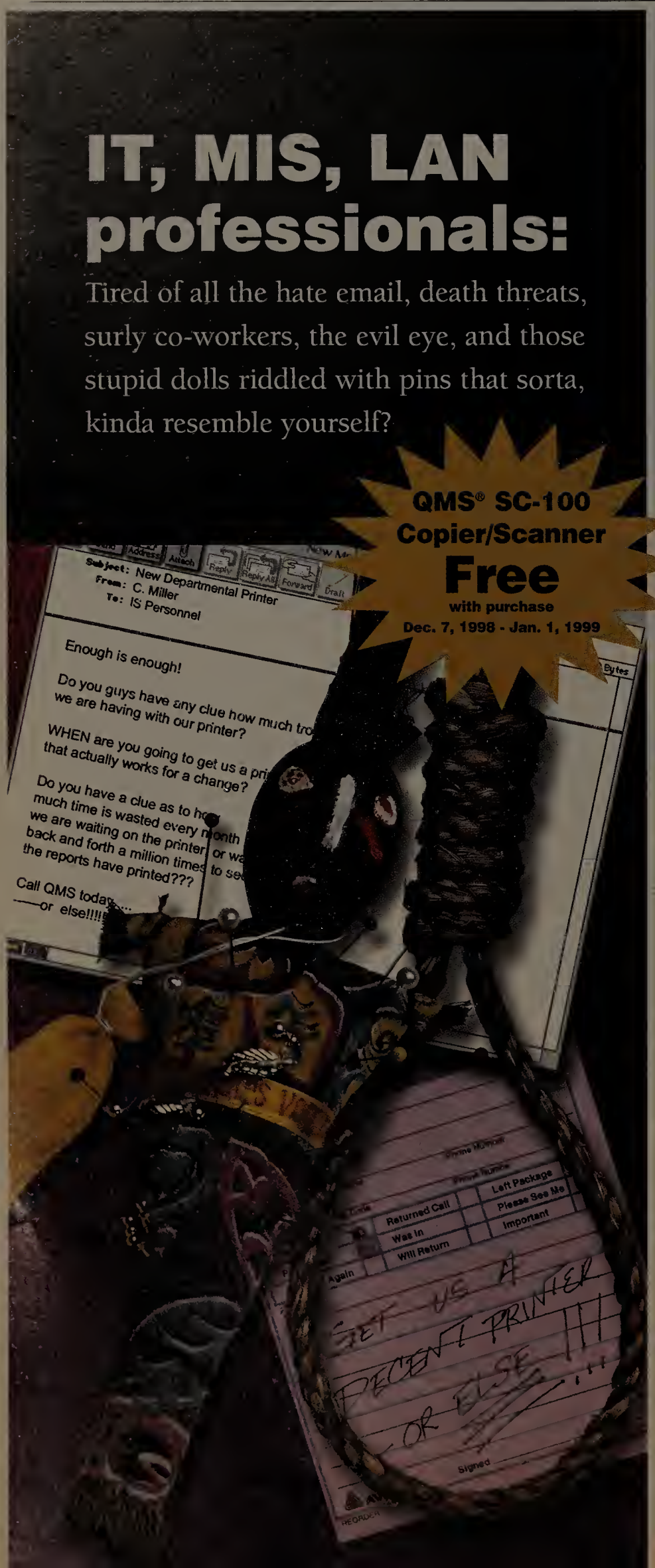
Sonoma

Continued from page 19

In addition to supporting voice, the modular Sonoma Access concentrator can be configured to take in Ethernet, Fast Ethernet, token-ring and FDDI traffic from LANs, and drop everything onto ATM wide-area links. ATM cards for the box are available for DS-1, DS-3 and OC-3 speeds.

Sonoma Access also supports inverse multiplexing of ATM links, allowing customers to effectively bond ATM DS-1s together to grow WAN pipes in increments of 1.5M bit/sec. The alternative would be to jump from a DS-1 to a 45M bit/sec DS-3, a much more costly option.

✆ Sonoma: (310) 827-8000



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Get more online:

- An overview of ATM security issues.
- A look at securing IP over ATM.

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Briefs

■ **Qwest** *has completed its* **acquisition of Icon CMT,** *a provider of Web hosting and other Web-based applications. Icon's sales channels and data centers are expected to support upcoming services from Qwest and Microsoft centering around e-commerce, off-site Web application hosting and streaming media. Icon CEO Scott Baxter will come on board as president of Qwest Internet Solutions.*

Baxter *to head division of Qwest*

Qwest is also forging ahead on its non-Internet business, announcing a multiyear contract with Ford Motor Co. The deal includes a variety of voice and data services, such as frame relay, 800 dial-up remote access and dedicated point-to-point services. Terms of the contract were not revealed.

■ **ICG Communications** *has* **sold its Netcom Internet access customers** *to MindSpring Enterprises for $245 million cash and stock. MindSpring will get Netcom's 400,000 dial-up, 3,000 dedicated and 18,000 Web hosting accounts, along with the Netcom brand name. But ICG is keeping the physical network, which includes 236 points of presence in 700 cities, to support its voice-over-IP services.*

■ **Global One,** *the joint venture of France Telecom SA, Deutsche Telekom AG and Sprint, last week* **signed a deal with NATO** *to provide voice and data services to government agencies within NATO member states. Global One products and services available via the channel include ATM, frame relay and IP network systems and services, international private lines and managed bandwidth.*

Cable telephony tops AT&T/TCI plans

FCC demands timetable for delivery of Internet access and other advanced services.

By David Rohde
Washington, D.C.

AT&T has decided to begin a nine-city trial of two-way telephony over cable — just as soon as the Federal Communications Commission approves its acquisition of cable giant Tele-Communications, Inc. (TCI).

And for its part, the FCC has signaled it will approve the merger — just as soon as AT&T commits to a schedule for ensuring the transaction benefits all sectors of society.

The chicken-and-egg game between the carrier and its regulators unfolded at the beginning of this year, following a holiday-season approval of the merger by the U.S. Department of Justice.

Facing the need to gain FCC approval to seal the TCI deal, AT&T announced it will market voice, video and high-speed data services over cable lines to customers in nine cities (see graphic).

Although the data and video services are largely unspecified, AT&T says the voice services will begin as ordinary circuit-switched telephony terminating over TCI cable lines. AT&T says it intends to switch IP telephony over the cable lines but not until next year. Also by next year, AT&T plans to offer local telephony in most TCI markets.

Making Kennard happy

If carried through, the moves should make federal regulators happy, particularly FCC Chairman William Kennard.

In a press conference to outline his 1999 goals, Kennard said the pending AT&T/TCI combination is one of the first mergers that seems to comply with the spirit of telecom reform.

"The merger has the prospect of being a very exciting transaction," Kennard said. Marrying cable lines with two-way telephony switching systems is "just what Congress anticipated in the Telecommunications Act of 1996."

But Kennard is not giving the two companies a free pass. He is insisting on a reasonable timetable in which the merged company will deliver Internet access and other advanced services to everyone. FCC staffers later said AT&T and the FCC have not yet come to an agreement on such a schedule.

This action puts AT&T in a bind because the FCC has more leverage than the Justice Department to put crippling conditions on the merger.

The Justice Department only ruled that the acquisition doesn't violate general antitrust rules. But the FCC gets to say whether the combined company must open its network to competitors under communications law. AT&T has warned that the deal is off if it comes with too many regulatory conditions.

If the AT&T/TCI deal survives the FCC process — as well as a shareholder vote currently underway — the two companies will have plenty of vendors eager to become part of the AT&T/TCI net.

In yet another beginning-of-the-year announcement related to the mega-merger, Cisco and General Instrument said they will work with AT&T on a nonexclusive basis to develop an all-IP multimedia system over TCI's hybrid network of fiber optics and coaxial cable.

The IP backbone will include the Cisco 12000 Gigabit Switch Router as well as its Universal Broadband Router, which acts as a interface between cable modems and the backbone network. Telephony gateways will be based on the Cisco ASX500 voice-over-IP gateway servers. ■

TAKING CABLE FOR A TEST DRIVE

AT&T will test cable telephony along with other cable services in nine markets this year.

SOURCE: AT&T, BASKING RIDGE, N.J.

Forum sanctifies ATM security measures

By Denise Pappalardo

ATM networks may be easier to secure, thanks to a new ATM Forum-blessed security specification.

At the ATM Forum's December meeting, the group firmed up 11 new ATM standards, which included the ATM Security Specification Version 1.0. The security specification, which has been in the works for about two years, defines how to set up authentication, confidentiality and access control on ATM networks.

User authentication can be based on Public-Key Infrastructure or a previously agreed upon security key, says Richard Graveman, chair of the ATM Forum's Security Working Group.

The specification enforces data integrity by adding cryptography at the ATM adaptation layer, which allows recipients to detect any modifications to or replays of old data. The feature is especially useful when handling constantly changing financial data, Graveman says. To ensure confidentiality, the specification states that each ATM payload be encrypted and the access control parameters be based on the Department of Defenses' ATM network access control guidelines.

Today, vendors implement proprietary security features that can end interoperability problems amongst multivendor ATM equipment.

The group also finished working on two important specifications that detail how to support voice over ATM in a WAN and how to set-up ATM network addresses. The two specifications are the ATM Trunking Using AAL2 for Narrowband Service and the ATM Forum Addressing Reference Guide.

© ATM Forum: (650) 949-6700

Get more online:

- **An overview of ATM security issues.**
- **A look at securing IP over ATM.**

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WAN MONITOR

1999: The year of interoperability?

Every year brings major technology improvements in the core functions of telecom equipment. Last year, we had hoped to see major interoperability progress in a few key areas, such as access, IP telephony and small office/home office (SOHO) network products. But, for the most part, 1998 was more a year of interoperability announcements than a year of actual products.

We did see the first Data Over Cable Service Interface Specification-compatible cable modems start to ship at year-end, and a bevy of DOCSIS offerings are scheduled to debut this year.

As the industry moves toward the retail model — in which you buy your cable modem, such as a 56K bit/sec unit, off the shelf — you can expect that plug-and-play interoperability will be a must-have feature. Sure enough, 1999 will bring major demonstrations and products from the cable sector to achieve DOCSIS interoperability. Hopefully, that will mean lower access prices and improved cable modem sharing across offices.

The digital subscriber line (DSL) folks had 1998 to puff their chests about interoperability as the year started with the big plug-and-play 1.5M bit/sec G.lite announcement. DSL vendors were misquoted as promising delivery by Christmas 1998; in fact, they said Christmas 1999. That's only a one-year difference. But still, this year you will see interoperable products from the DSL vendors that will drive down the costs of these modems.

Daniel Briere
Christine Heckart

On the SOHO network front, we've talked before about wired homes and home networks, and if you've read anything about the recent Winter Consumer Electronics Show in Las Vegas, you know this was the topic of the year there.

In 1999, SOHO equipment vendors really have to produce some standards and interoperability or the whole movement will be stopped dead in its tracks. What's the point of having a really smart home wiring infrastructure if you cannot plug anything you want in to it? A whole plethora of companies are pitching their ideas.

Finally, we had hoped that 1998 would be the year many of the standards for voice over IP would be finalized and interoperability would begin. Well, we're pretty far away from any semblance of interoperability; some have joked we're still working on operability.

Without interoperability, true growth in interservice provider voice-over-IP offerings will be limited. That means the big event that would drive down pricing of core voice services — worldwide, quality-of-service-based IP voice services — is still a little bit off. Lacking such interoperability, you have to rely on your provider to expand its IP offerings to all the places you want to go and to cut special transit technology deals where it can. This fact just slows the uptake of the voice-over-IP services.

Briere is president and Heckart is vice president of TeleChoice, a consultancy in Boston. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

Ivar Plahte
Director of Telecom Over IP, Telenor

"When it comes to H.323 compliance, Ericsson sets the standard."

As cold as Norway gets, it's the hottest place on earth for IP telephony. That's because Ivar Plahte and his team at Telenor are the first to use the carrier-class H.323 Gatekeeper from Ericsson. And now with the power of Ericsson, Telenor is on the verge of becoming the hottest name in telecommunications.

As the first standards-compliant Internet telephony gatekeeper, H.323 Gatekeeper isn't just source code. It's a full-blown system that puts Ivar in total control of his network operation. Now Ivar and his team can customize service categories and profiles for subscribers, utilize least-cost routing, and boost network reliability. And because Ericsson's H.323 Gatekeeper is written in Java, Ivar can rest assured that all his vendors' platforms will interoperate — making sure his IP telephony investment is protected for years to come.

For more information on H.323 Gatekeeper, visit our website at www.ericsson.com/iptelephony. And find out how Ericsson can help you set your own standards.

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SPECIAL FOCUS

Carrier turf battles

CLECs vs. RBOCs: A nice war?

Despite conciliatory comments between local carriers and upstart competitors, they're still at each other's throats.

By Tim Greene

Most wars are simple. Each side fights as hard as it can until one gives in. But the fight between competitive local exchange carriers (CLEC) and regional Bell operating companies is different.

Sure, each wants the other's business. But rather than constantly beating each other over the head, RBOCs and CLECs are learning that sometimes it actually makes sense to say nice things and cooperate with each other.

Anexample came this month when CLEC Allegiance Telecom praised RBOC Bell Atlantic for setting up electronic bonding. Bonding links both companies' operations and support systems in New York and lets customers switch services from one company to the other more quickly.

With Allegiance's endorsement, Bell Atlantic can say it is meeting regulatory requirements to allow electronic ordering by competitors. That requirement is a key and vexing item on a 14-point checklist RBOCs such as Bell Atlantic must meet before they can win long-distance approval.

For its part, Allegiance gets bonding ahead of other CLECs.

Not all CLECs find cooperation to be a wise strategy, however. In fact, the friendly relations between Allegiance and Bell Atlantic have angered other CLECs, in particular, MCI WorldCom. While primarily known as a long-distance carrier, MCI WorldCom behaves like a CLEC in its efforts to sell local services. In that role, WorldCom had been a member of the CLEC body, the Association of Local Telecommunications Services (ALTS).

But partly because of Allegiance's friendly attitude toward Bell Atlantic, MCI WorldCom quit ALTS. An MCI WorldCom spokesman says actions of other ALTS members contributed to the decision to pull out, but the spokesman would not specify the actions.

Royce Holland, who heads ALTS and Allegiance, says making nice with the RBOCs is just part of a carrot-and-stick approach. He says Allegiance is prepared to formally endorse Bell Atlantic's bid to get into long distance if Bell Atlantic follows through on its electronic bonding promises. "It sends a message to all the other RBOCs," Holland says.

MCI WorldCom says Allegiance is accepting less than what CLECs should from Bell Atlantic. In exchange, Allegiance gets quick entry into the market and a quick return on its investment. MCI WorldCom has a long range, more ambitious goal that calls for getting Bell Atlantic and other RBOCs to comply fully with telecom regulation requirements. Once that compliance is in place, MCI WorldCom will expand its presence in the local phone market.

One MCI WorldCom goal is discounted RBOC services packages that it can resell at a profit.

For its part, Bell Atlantic says it welcomes competition to the extent that it helps its efforts to get long-distance authorization. In Pennsylvania, Bell Atlantic says the presence of CLEC Commonwealth Telephone Enterprises and Bell Atlantic's phone network is a boost to its argument that local phone competition exists.

CLECS BRING SPEED AGAINST WEIGHTY RBOCS

CLECs and RBOCs bring different weapons to the battle for control of the local loop.

	RBOCs	CLECs
Strengths	▲ Plenty of money ▲ Established names and customer base ▲ Own local phone lines	▲ Focus on limited market ▲ Quick to develop and deploy services ▲ Free to cherry-pick RBOC customers ▲ Staff has an entrepreneurial mind-set
Weaknesses	▼ No national sales force ▼ Required to cover all markets with services ▼ Traditional monopolistic mind-set	▼ Rely on shrinking pool of borrowed money ▼ Spotty geographic coverage ▼ Limited time in which to become profitable

The battle rages

Make no mistake, even with seeming cooperation between the two camps, the CLECs are still intent on stealing RBOC business.

Typically CLECs are picking just a fraction of the RBOC market to attack, and therefore will specialize in that area. For example, CLEC Focal Communications focuses on voice services for small businesses. It hopes to steal RBOC customers by offering lower prices and better service. Like most CLECs, Focal is counting on RBOCs being too slow and traditional to react effectively.

CLECs are also attacking with services customers have never seen before. One such service is low-cost IP telephony with all the features of current circuit-switched phone service. The service will be bundled with virtual private networks that give customers access to server-based applications that are part of the carrier network. Innovative services such as digital subscriber line (DSL) are part of what draws customers to CLECs.

One such CLEC, Covad Communications, attracted Bill Yundt, vice president of network operations for WebTV in San Francisco. Covad's expertise is setting up DSL remote access, which is what Yundt wants.

Nobody knows, of course, how the battle will end. Many CLECs planned to rely on the sale of high-yield bonds to finance their new networks, says Todd Dagres, a general partner at Battery Ventures, a venture capital firm in Boston. A stock slump that makes those investments unpopular could hurt CLECs, he says.

Also, many CLECs will be too small to make it on their own. Many will wind up merging with others to gain bulk or will be bought by larger carriers, he says. "It's easy now to take business away from RBOCs," Dagres says. But that will change as RBOCs get a better sense of the threat that CLECs pose as a group.

CLECs realize that RBOCs have them outgunned with money and ownership of the local loop, and have adopted strategies accordingly. Randy Lowe, general counsel for regulatory affairs at Transwire, a New York CLEC, says the matchup is like the British vs. the colonists during the American Revolution. The British marched en masse in rigid formation down the center of the field, literally hoping to overrun the enemy, Lowe says. "The colonists were hiding behind rocks shooting and running. That's what we do," Lowe says.

While the colonists eventually drove the British out, nobody expects that to happen to the RBOCs. But the battle will trigger a fundamental change in how RBOCs do business. No longer protected by monopoly status, they will have to compete on a more equal basis with ever-strengthening CLECs, according to Steve Sazegari, a principal at Tele.Mac, a telecom market and research firm in Foster City, Calif. ■

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Briefs

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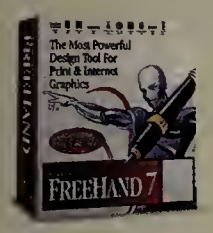

FreeHand *witt be a topic at Macromedia's seminars.*

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■ *Start-up* **Shym Technology, Inc.** *has released the beta version of PKEnable. This client/server software, which costs $10,000 for 100 users, lets Windows and Unix applications from SAP, PeopleSoft, Lotus Notes and Documentum work with Entrust Technologies and VeriSign public-key infrastructure equipment.*

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■ **Zergo Holdings** *and* **Baltimore Technologies,** *two London-based companies specializing in public-key infrastructure products, merged last week. The new company, to be called Baltimore, has more than $30 million in earnings and 350 employees worldwide.*

■ **Wingra Technologies** *in Madison, Wis., last week announced that it has extended its software and service offerings to cover migrations from Lotus Notes, Microsoft Exchange and Novell GroupWise. The company previously had only handled migrations from Lotus' cc:Mail and Microsoft Mail.*

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In-Site: *Lessons from leading users*

Java lets Web grocer know what you hunger for

By Ellen Messmer
Westwood, Mass.

Streamline, Inc. can already deliver groceries, restaurant meals and videos at customers' requests. Now the online grocer is trying to determine what its customers want before customers even know.

Streamline is not telepathic. It is, however, using a kind of artificial intelligence software that watches what the shopper does on its site, develops a buyer's online shopping history and then makes recommendations according to the shopper's past and present needs.

"For instance, if you're buying a liter of Coke, our Web site might suggest you buy a two-liter bottle because it's a better value," says Gregg Kaplan, Streamline's director of interactive marketing.

"If you buy salsa, we might recommend that you buy chips. And if we see you buy Tide detergent each week, we'll ask if you want Tide put on your customer replenishment list for your regular delivery," he says.

Streamline will know how customers react to this type of cutting-edge sales pitch next month when it introduces its Web-based virtual advisor. The new feature was made possible by a complete revamp of the company's Web server.

At the core of this transformation is eDialog, Java software, currently in beta-testing, from Manna Network Technologies. The software lets you set up elaborate business logic rules that help predict customer buying patterns.

The Manna software relies on Java servlets: one that pulls personal information about the buyer and another that gets his buying history from back-end databases. The servlets combine information to answer the question: What does the buyer want based on what he's currently doing online?

"We have a unique learning system that combines different types of information. For instance, I may know that you as a customer are price-sensitive and a vegetarian," explains Zeev Rozov, founder and president of Manna, an Israel-based start-up with offices in Boston.

"We listen to what customers are doing, feed it into our real-time learning center, and it acts to reach a decision based on these business objects," Rozov says.

According to Kaplan, the main drawback to Manna's server code is it can take up to two weeks to alter the elaborate business logic rules. But Manna is working to revise the software to let the user instantly implement rule changes.

Though the name may change, eDialog will ship early next year and will cost between $80,000 and $150,000, depending on implementation. Manna charges separately for its systems integration expertise.

Streamline, which claims to be gaining almost 200 customers each month, is betting that the cost and effort required to adapt to the Manna model of interactive marketing will be worth it.

"We need a way to do automated replenishment of deliveries for customers," Kaplan says. "They have a technology perfect for what we're doing." ■

ARTIFICIALLY INTELLIGENT GROCERY SHOPPING

Online grocery service company Streamline uses a database and Manna Web technology to track customers' shopping habits, anticipate shopping trends and make suggestions to users.

Drumbeat pounds away at Web development with new tools

By Robin Schreier Hohman
Carlsbad, Calif.

Elemental Software last week added a host of enterprise features to its Drumbeat Web development tool.

Drumbeat 2000, which shipped last week, includes new scripting and database integration tools.

The latest version lets developers build applications with Visual Basic. It supports the Common Object Model, a way to store reused modularized procedures, and is compatible with Active Server Pages, which enable the user to interact closely with the Web server.

Drumbeat's interface is loaded with 30 Point-and-Click Interactions, which are ways to implement canned scripts for common procedures such as database filtering, password protection, data validation, profile-based access and state management.

The developer clicks on an object type, such as a password or dropdown box, and then the software shows what interactions are possible for that type. For example, the software would suggest a script that would allow for multiple choices for a checkbox but only one choice for a radio box. Drumbeat 2.0, the previous version, only supported edit boxes.

Drumbeat 2000 also supports ShockWave and Portable Definition Format files, as well as charts, graphs, streaming media and tabbed dialog boxes.

In order to implement a Drumbeat application, you must have a database, as well as access to Windows NT Internet Information Server 3.0 and higher, or Microsoft's Personal Web server for Windows.

Elemental is teaming with several ISPs to host Web sites in conjunction with Drumbeat.

Drumbeat 2000 sells for $399, with a $249 introductory price. Current customers can upgrade from Drumbeat 2.0 at no charge.

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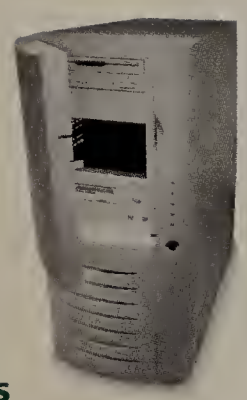

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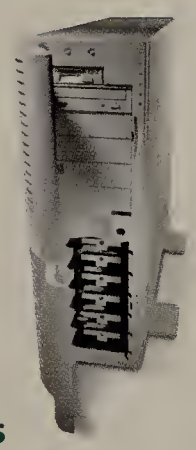

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'NET INSIDER

Does Bill still use e-mail?

If I were Bill Gates, I'd sure be leery of one aspect of modern technology. And if I were the president or a major officer in just about any major corporation, I'd also be leery.

Watching the low-resolution video of Microsoft's CEO being asked about e-mail he sent or received in years past is bound to make anyone try to remember what damaging or misleading mail he has sent and resolve to take care in the future.

During the discovery process of the government's antitrust suit against Microsoft, vast numbers of the company's documents were subpoenaed, including reams of copies of old e-mail messages. A few of these messages have been used to challenge Microsoft statements.

But even in this trial, Microsoft has not been the only one challenged by its old mail. In fact, Microsoft itself successfully challenged the appointment of Harvard professor Larry Lessig as an independent expert in part by pointing out a joking e-mail message he once sent to a friend.

While the risk of your e-mail messages to friends or business associates coming back to haunt you years later is worrisome enough, one of the features of the Internet is a combination of a seemingly limitless memory and a surprisingly efficient retrieval system. Just about everything that you send to any electronic mailing list or news group, just about anything that someone says about you electronically and any Web pages that might include references to you are all saved someplace.

That is bad enough, but what makes this worse is that someone who is looking for information about you can find many of these references in a few seconds using any number of search engines. Even though I'm somewhat in the public eye as a writer and am involved in the standards world, it is a bit daunting to find more than 1,600 hits on my full name in AltaVista. (I can take some comfort in the fact that while this is more than I'd like, it pales beside the 111,752 hits that come up for Bill Gates.)

Scott Bradner

Even worse is the fact that this stuff seems to stay around forever. Long after your indiscrete posting to the alt.barney.kill.kill newsgroup has expired in the local news servers, it will linger in some archive. In somewhat of a democratization brought about by the 'Net, all Internet participants from corporate CEOs to high school kids are equally subject to having potentially embarrassing tidbits from the past pop up at inopportune moments. Like when you find out that the personnel officer at the company you are applying to does a Web search on every job applicant.

This certainly is a privacy issue, but it can be much more, as demonstrated by the Microsoft case. It is a hard process indeed to continually weigh the balance between the convenience and efficiency of e-mail and the possibility of what you are saying being used against you and your company in the future.

Disclaimer: If I were Bill Gates, I would have an endowment five times that of Harvard's. But the above is my opinion, not Bill's or Harvard's.

Bradner is a consultant with Harvard University's University Information Systems. He can be reached as sob@harvard.edu.

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My company is consolidating servers, which are spread throughout the building, into one secure room. Because of budgetary constraints, I have to protect all the servers with one uninterruptible power supply (UPS). What should I be concerned about with this plan?

Via the Internet

Before moving the servers, you need to address several facility issues. Make certain enough AC power is being fed into the room. An electrician should be able to tell you after reviewing the power requirements of equipment already in the room and factoring in additional equipment.

Ideally, each server should be on a separate circuit to keep a breaker failure in the distribution panel from affecting more than one system. See if the electrician can feed the computer room with more than one phase of AC power. Having more than one phase present in the computer room can help prevent everything from going down if one phase fails.

Also, check with the company's heating and air conditioning company to see if you have enough cooling capacity for all the equipment. Ideally, you want to keep the room close to 68 degrees.

As for the UPS issue, assuming the unit is of sufficient size, you could put all your servers on it. However, by doing so, you introduce a single point of failure. Also, many UPS units have only one serial port for server-related management software. I suggest putting no more than three servers on any one UPS.

Starting next week, look for "Nutter's Network Help Desk" exclusively on Network World Fusion (www.nwfusion.com).

Bringing Fibre Channel to the mainframe

By Allan Meritt

In March, IBM will start to deliver new mainframe channel connectivity products based on technology called Fibre Connection (FICON). FICON is a new high-performance I/O interface for Big Iron that supports the characteristics of existing and evolving higher speed access and storage devices.

In a nutshell, FICON products — from IBM and other vendors — will use a new mapping layer that is based on the existing ANSI standard Fibre Channel-Physical and Signaling Interface (FC-PH). FC-PH specifies the physical signaling, cabling and transmission speeds for Fibre Channel.

Each FICON channel is capable of supporting more than 4,000 I/O operations per second, which allows each channel to support the same capacity as up to eight Enterprise Systems Connection (ESCON) channels. FICON channel link speed is 100M byte/sec, compared with 17M byte/sec with ESCON links. The full-duplex nature of FICON channels permits them to read and write data concurrently on the same link. IBM is positioning FICON products as a follow-up technology to fiber optic-based ESCON offerings.

FICON products will help customer systems better handle data-intensive workloads and will provide the ability to exploit rapidly evolving device and high-speed link technologies. Technology advances are leading to growth in the data rate capabilities of links and devices, as well as growth in the amount of data stored by a control unit, thus requiring access to more devices. Applications, such as business intelligence, storage-area networks and electronic commerce, benefit from increased data rate and storage capacities because they deal with large data objects and large total amounts of data.

Disaster recovery functions, such as tape vaulting, remote disk copy and geographically dispersed parallel sysplex, which are multiple mainframes strapped together as a single unit, will benefit from the large distance supported by FICON channels. Although direct links between FICON devices of 10 kilometers are supported, 20-kilometer links are possible under certain conditions. The FICON protocol also permits additional end-to-end error checking above that provided by the FC-PH transport.

A FICON channel can operate in native mode or bridge mode. Native mode works with new control unit interfaces and provides the maximum system benefits, such as high end-to-end bandwidth. Bridge mode uses an alternate mapping transports between the FICON channel and a new FICON bridge that supports the attachment of existing ESCON control units to the FICON channel.

From the channel's perspective, both modes exploit the underlying multiplexing capability of Fibre Channel. ESCON supported only one active connected operation and half-duplex data transfer. In contrast, FICON supports multiple active connected operations and full-duplex data transfer.

In native mode, multiple operations may be active on each control unit, as well as across multiple control units. Native mode also supports greater addressability on an individual control unit and greater bandwidth for individual operations.

In bridge mode, ESCON protocols limit activities to one operation per control unit, but multiple control units can be active across the FICON channel. Similarly, there is no increase in bandwidth for any individual control unit because the control units are still on ESCON links; however, there is an increase in addressability (for example, the number of storage devices) that can be communicated with.

In effect, a FICON channel operating in bridge mode acts as a time-division multiplexer, permitting it to do the work of up to eight ESCON channels, even though it is defined as a single channel to the system. In native mode, operation ranges from time-division multiplexing among many operations to a single operation using full bandwidth.

Customer investment in ESCON products is protected in a number of ways. Program compatibility is maintained because I/O operations that worked on ESCON continue to work on FICON. A customer's existing fiber infrastructure can continue to be used, subject to distance constraints of the high-speed technology.

FICON protocols have been streamlined compared with ESCON. Interlocked exchanges have been reduced, improving efficiency and reducing overhead and sensitivity to distance.

FICON is also designed to support a mixed workload: Small data transfers, typical for transactions, do not have to wait for large data transfers to complete.

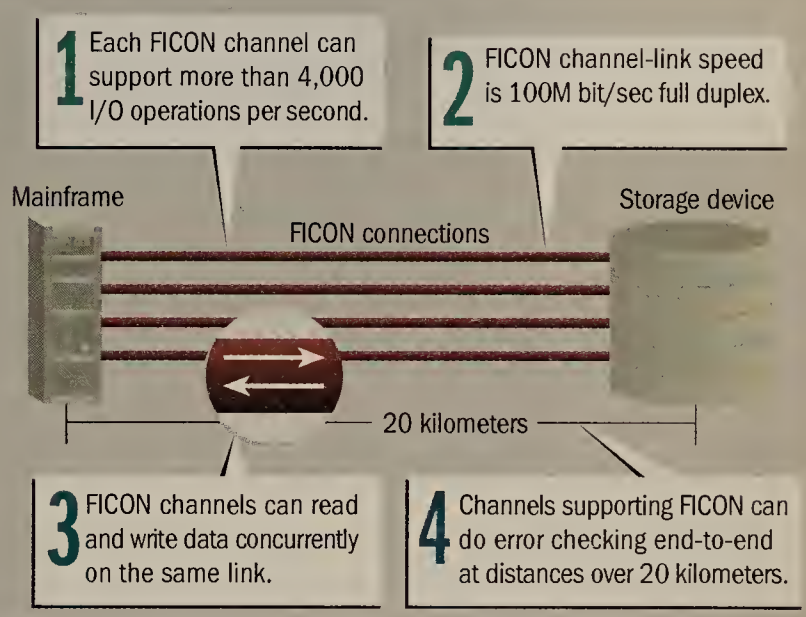
Instead, they are multiplexed on the link with the long-running operations. This helps to simplify configurations and removes one of the inhibitors to having a single database for transaction processing and business intelligence workloads.

Meritt is a senior technical staff member with IBM in System/390 System Design, Poughkeepsie, NY. He can be reached at (914) 435-5596 or meritt@us.ibm.com

UP CLOSE

FICON

IBM will soon deliver products based on Fibre Connection technology. FICON is a new high-performance I/O interface for linking downstream devices, such as storage area network controllers and disk arrays, to the mainframe. The idea behind FICON is to offer a high-speed, high-capacity pipe to the mainframe capable of handling bandwidth-crunching application traffic.



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Bugs from the Internet to your PCs.

The Internet is to the computer virus what the airplane is to the biological virus; it travels around the world, and it's populated by everyone, healthy or not. That's why McAfee Total Virus Defense (TVD) fends off virus attacks anywhere they happen on your network, using a multi-layered defense against the scumbags, hackers and malicious code crackers of the world.

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EDITORIAL *insights*

Cybervigilantism: Don't even think about it

Winn Schwartau's story last week on cybervigilantes — network break-in victims who take the law into their own hands — has generated a flurry of discussion and controversy (*NW*, Jan. 11, page 1). The story got high play on CNN's Web site, for example, where 82% of the nearly 7,500 people polled said it's fine for companies to fight back on their own against net crackers.

Network World readers participating in our online forum were more moderate (www.nwfusion.com/forum/vigilante.html), but still more than half of those polled favored fighting back in kind against attackers. One reader, fresh off a network break-in, wrote, "If I could find the physical being responsible for this, well, let's just say me and Mr. Cipher would have some common interests." He was referring to "Lou Cipher," the pseudonym of a security manager quoted in the story who claims to have taken a baseball bat to the knees of the people who broke into his company's network.

That scares me. While I sympathize with the victims of security breaches, I draw the line at fighting fire with fire. Why?

- Violence begets violence. Lashing back might feel good, but you have no idea what response your virtual or physical muscle-flexing may generate. To get a chilling sense of how far awry retaliation can go, read Walter Van Tilburg Clark's classic novel *The Ox-Bow Incident* or Tobias Wolff's terrific story "Chain" in his collection *The Night in Question*. In "Chain," a father is enraged when his child is attacked by a careless owner's dog and the police do nothing. So he takes things into his own hands, setting in motion a chain of events that ends badly. Very badly.
- You open yourself and your company to criminal or civil liability. Attack the wrong target, do some damage and, voilà, your company's on the wrong end of a big lawsuit. Or you may find the police coming after you, rather than the people who started the attack.
- You divert resources from the real job — securing your network.
- You perpetuate the problem. The only long-term solution to our collective security problem is an effective legal response. Yes, law enforcement agencies are overwhelmed. But unless companies press for more enforcement resources and work through the proper channels, the system will never evolve to deal effectively with security threats.

Lead by example. Do everything you can to seal up your network, and work with the proper authorities if you're hit.

John Gallant, editor in chief jgallant@nww.com

Vendor report card • Wayne Spivak

Dell has the mettle to meet enterprise expectations

Dell Computer is one of the driving forces in the PC market, selling $3.65 billion worth of computers each year to consumers and businesses, according to company estimates. But how does Dell fare in large enterprises?

As network managers, we choose vendors that offer the best equipment at the best price. But if their technical support isn't up to snuff and we can't get our equipment serviced — which raises the total cost of ownership (TCO) — what good is a low selling price?

So the question is: After the glitz of the Web site has faded and the computer has been delivered, does Dell stand behind its computers? What is the true TCO of a Dell computer?

The TCO of a Dell machine, at least for a small business, usually includes only the cost of the hardware. Not included in that estimate are the hours spent on the phone with a technical support person. Multiply the hourly rate of your staff member who is making that support call, and the TCO increases. In Dell's defense, telephone diagnosis of a computer is not easy, especially when the customer's knowledge level can range from supernovice to superengineer.

In addition, Dell faces the same problem as countless other firms: finding and keeping qualified technical support personnel. "Here's the tricky part, trying to find thousands of technically minded people to man the telephones. We've pretty much sucked Austin dry," a Dell employee told me. "There was a point there for a while when Dell would hire hundreds of people per week. Now it's hard to even get somebody in the door that's worth a second look. It's tough to find Silicon Valley talent in the Silicon Gulch."

Nevertheless, Dell receives high marks from large enterprise customers. Paul Smith, who handles desktop support at Millipore Corp., a Dell preferred customer, told me: "We've been using the Premier service for about a year, and Millipore is thrilled with the support and response we've received from Dell."

Dell provides a plethora of information and services to corporate clients. Dell's Premier service, which is available to preferred, large and enterprise customers (the terms Dell uses on its Web site for such customers change daily), includes customizable Web sites. The Premier pages permit the customer to create a personalized Dell extranet, be it for the customer's ultimate end user, IT group or accounting department.

Areas on the Premier pages include technical support, diagnostic tools, Return Material Authorization forms and "practical tools for commerce, help desk activities [and] order status." Dell also offers several different levels of support for the enterprise, from programs for the self-maintaining company (Dell will even certify your staff) to on-site service agreements. Dell seems to have covered the gamut.

One enterprise customer I spoke with, a staff member at the Australian Department of Defense, expressed disappointment with Dell's technical support, noting if a Department of Defense staffer showed "the level of knowledge of systems that Dell technical staff members display, he'd be shown the door." He added, however, that "Dell's offerings have proven to be above average for reliability and value, and people seem to be quite happy with their aesthetics."

In addition, Dell has one of the most dynamic Web sites I've ever visited. In several visits over the course of a week, page content changed — sometimes dramatically — as did the marketing terms already mentioned. Not that there's anything wrong with that, to quote Jerry Seinfeld.

So if you have a large enterprise and you're looking for a vendor to supply your corporate and individual employee hardware and software needs, Dell Computers should be on your short list.

*Spivak is president and owner of SBA * Consulting, an IT consulting firm, and SBA.NET.WEB, an Internet consulting company. He can be reached at wspivak@sbanetweb.com.*

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification

Mind your manners

If Miss Manners (my role model) were to read Mark Gibbs' column about Internet etiquette ("Etiquette, monkeys and the Internet," Dec. 14, 1998, page 66), she would deeply approve. It seems to me the Internet, being such an essentially immediate entity, really needs etiquette to avoid interpersonal thermonuclear meltdowns.

People seem to equate etiquette with Victorian times (when it was raised to an artificial and stifling level) or with diplomatic affairs (which we all mistrust, and with reason).

Usage pricing has a long way to go

Last month, Qwest joined a distinguished list of service providers that have tried to introduce some form of usage-based pricing for data services. Pundits immediately pointed out that network managers have resisted any shift away from traditional fixed pricing.

You may wonder how these carriers could be so dumb as to try something that has always failed. Well, maybe they know something.

The truth is, there are two different network markets. One market consistently rejects usage pricing and probably will forever; the other market is eager to embrace usage pricing. So depending on which market you happen to survey, you either believe that usage pricing is culture's only salvation or that it's the last bastion of international communism.

So far, the problem has been that the "we hate usage pricing" market is made up of nearly everyone who currently buys data network services. Traditional networking is supported by a network operations group that has a budget. This budget is based on the total cost of all network projects. It's a fixed budget, and network managers are accountable for it.

This is where the usage-price phobia comes in. If you have recently justified a specific cost with your carefully crafted plan, the last thing you want is for that cost to suddenly increase. Network users have an ugly habit of, well, using. If usage is what determines cost, using the network could make costs mount. Fixed pricing is safer.

Network managers who administer private enterprise networks are the easiest network users to find and survey. Thus, surveys always show a resistance to usage pricing. But this group isn't the only market for data network services.

How about the other market — the one in favor of usage pricing? For that, we have to look earlier in the evolution of network cost, to the point at which those network projects were first proposed. The typical network project starts with a business need that has a dollar benefit associated with it. Planners develop a network to the project's requirements and develop a cost figure for the network. If the benefit is significantly greater than the cost to meet corporate requirements for return on investment, the project gets approved.

This process has two shortcomings. First, it takes a lot of time to complete. That tends to disqualify using data networks to solve business problems or seize opportunities that spring up unexpectedly and require quick action. Second, the equipment part of network cost comes in the form of depreciation, which spreads the buying price of the net equipment over a multiyear period. If the benefits don't last as long as the depreciation does (for example, if a one-year crash project involves buying equipment depreciated over three years), users end up still paying for the equipment long after the project ends. This scenario, in short, only works for a few core applications — exactly what we tend to see running on private networks today.

Usage pricing would solve this problem. Give a buyer a network service that starts billing when you start sending and stops when you stop, and you have the perfect response to one of the short-term problem/opportunity applications of data networking.

Buyers report that they regularly disqualify data network solutions to business problems based on a combination of start-up delay and life cycle. In 1998, the total value of disqualified projects was almost 25% of the world's total data service revenue, according to my poll of 119 users worldwide. But even that figure understates the loss to service providers and businesses because almost 90% of all business problems that are too tactical for today's data networking aren't even presented to planners. The truth is, if we could get usage-priced, expense-style data services, we could create as much demand for data services as we do for voice.

Senior management and management planners in most large businesses know how important usage-priced data services could be to them, and that's why service providers keep coming around to this issue. That Qwest has done so at this point only validates that there's another opportunity out there — and a big one.

But we've got a long way to go, even with Qwest's pricing plans. Like others before it, Qwest has delivered usage pricing in the context of switched virtual circuits (SVC), and those killer applications don't support anything other than good old connectionless IP. Making SVCs useful in IP applications requires integrating special equipment with the service. That hasn't worked yet, either.

Usage pricing, from Qwest or others, also depends on the buyer's ability to get a local access connection that's fast and inexpensive. Otherwise, there's no way to get connected to those tactical usage-priced services. Access has been one of the downfalls of Sprint's Integrated On-Demand Network strategy, another attempt at providing flexible services to users. We may need to wait for the access problem to be solved before any form of usage-priced service can be effective.

Nolle is president of CIMI Corp., a technology assessment firm in Voorhees, N.J. He can be reached at (609) 753-0004 or tnolle@cimicorp.com.

Who cares who sits above the salt or to the king's right? Oh horrors, I've gone calling and forgotten my gloves! What a crock, er . . . delightful reminder of bygone days!

I've always regarded rules of etiquette as mutually understood guidelines for social behavior that enable people to feel comfortable in whatever surroundings or situations they find themselves. If Ken Baker has a problem with etiquette when viewed in this way, then he is probably one of the slovenly heathens who wears baseball hats in restaurants and movie theaters.

Patricia Greaves
Marketing communications specialist
Dallas Semiconductor
Dallas

I agree with Mark Gibbs: I think more people become ruder online, but I think it may have cultural roots. In short, the "Ugly American" has come to the Internet.

I mainly have dealings with the English and French, and I find them unfailingly polite and helpful, online and offline. Courtesy and politeness are rules society has established so people can get along. Americans are famous worldwide for their rudeness. This rudeness may be a function of the capitalistic mind-set or the fact that the majority of netizens still seem to be young (i.e., immature) and male. Politeness and courtesy may be dispensed with online because they "get in the way," "take too long" or are seen as not important, and that is a shame.

It is a sadder, colder world without courtesy. To paraphrase Winston Churchill, there is nothing as terrifying as civilization stripped of its civilities.

Joseph Hayes
New York

My group of friends recently had a discussion on the origins of etiquette. One friend mentioned a sociological theory that etiquette evolved as a means to control violence (your monkey heritage). It does seem that the cultures that are most overcrowded (and thus with the greatest potential for violence) also have the most rigid protocols for behavior.

Perhaps Ken Baker also believes that communication protocols for data transport are elitist as well. After all, most of the world's population has no idea that TCP/IP or HTML exist, let alone that all those pretty pictures couldn't get onto your computer screen without them. Communication protocols in cyberspace serve the same function as etiquette in the real world. I would no more dream of asking a fellow human being to provide a favor without the ritual exchange of pleasantries than I would expect a server to provide a service to a client without the ritual exchange of packets.

I agree with Gibbs that American capitalism does not preclude the observance of proper etiquette. If anything, market studies show that people are willing to pay more for better service.

Denise Vincent
Herndon, Va.

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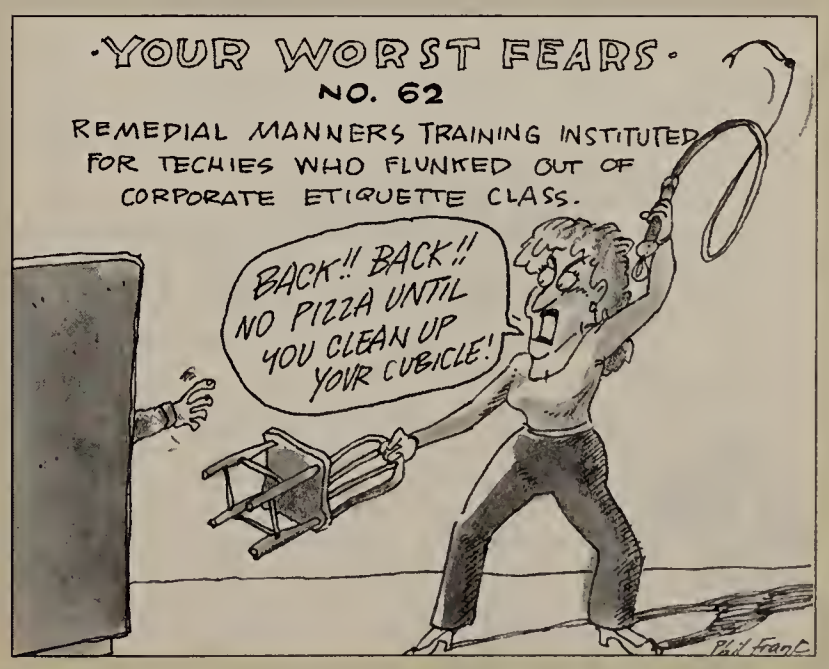

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FRAME RELAY ACCESS DEVICES

Talk is cheap with frame relay

More FRADs are carrying IP voice traffic, as frame relay vendors vie for a piece of the VPN market.

By Tim Greene

NAOMI SHEA

The latest word in frame relay access devices (FRAD) is voice. With all the talk about service providers migrating to IP networks to carry voice and data, FRAD vendors seem to be responding with IP voice of their own. Nine of 20 FRAD makers included in our online Buyer's Guide chart (www.nwfusion.com, Doc Finder: 1121) now support voice over IP and voice over frame relay. The combination gives FRAD users the option of carrying voice over IP among sites or buying a frame relay link into a service provider's IP network.

ISSUES AND TRENDS

IP voice support is a way for frame relay to sell itself as the access link to IP virtual private networks (VPN) that connect corporate sites to each other or to the sites of business partners. With IP voice, workers at those same sites can talk to each other as well as share data, making a VPN more cost effective.

FRAD makers' interest in VPNs is also made clear by the inclusion of encryption capabilities in their boxes. Encryption is a standard requirement for corporations using public IP networks to link sites that share sensitive corporate data. Five products in our chart include encryption: 3Com's OC NETBuilder 120 KF; Cisco's 2600 series; Hypercom Network Systems' IEN 4000; Motorola's Vanguard 6450/30 series; and TimePlex Group's Synchrony IAN-150.

For years, vendors shied away from adding voice capabilities to their FRADs. The advent of a standard for voice over frame relay in 1997 seems to have turned the tide strongly in favor of voice. Part of the appeal of voice over frame relay links is that they can reduce the amount of voice traffic among corporate sites that must travel over traditional public voice networks or dedicated voice trunks. That feature can save money.

Frame relay voice, which in demonstrations is of high enough quality to carry conversations easily, is suitable to VPNs because users realize they are using a packet network and have lower expectations than they would for a circuit-switched telephone network.

All the FRAD vendors in our chart that include voice capabilities build them right into the FRAD, eliminating the need for separate voice gateways to packetize voice calls coming from the local PBX.

Advances in voice compression technology squeeze that traffic down to less than 5K bit/sec in the case of ACT Networks' SDM-9350 and SDM-9400, Develcon Electronics' Athena Access, Hypercom's IEN 4000 and Netrix's Network Exchange 2210.

The effect of compression is twofold. First, compression reduces the total traffic traveling over the frame relay link. That means the link doesn't need to be as large, saving the customer money. Second, compression reduces the demand on the link for guaranteed bandwidth, which is known as committed information rate (CIR). Voice requires low and predictable latency. If the voice traffic is compressed, it requires less bandwidth and, therefore, a smaller, less expensive CIR.

FRAD vendors are making an attempt to pinch bandwidth being used by data over the network by including data compression. While the numbers are not as impressive as they are for compressing voice, data compression can cut the size of WAN data transmissions by roughly 75%. That assumes, of course, that the data is not already compressed. Also, the compression achievable may depend on the type of data involved.

All the FRAD vendors surveyed also prioritize traffic over single permanent virtual circuits (PVC). That prioritization means specific types of traffic can get onto the network faster than others without having to pay for extra PVCs.

Another new twist in FRADs is support for ATM. So far, though, just one of the 21 FRADs included in our survey supports ATM — Cisco's 2600 series.

That feature enables the box to fit into hybrid

INSIDE

Review: The aptly named Colorado Rapid from Ericsson Datacom Access runs the fastest of the four FRADs we tested.

ONLINE

Interactive Buyer's Guide: See how 21 FRADs from these 20 vendors stack up against one another.

- 3Com
- ACT Networks
- Cisco
- Develcon Electronics
- ECI Telematics
- Ericsson Datacom Access
- FastComm Communications
- HT Communications
- Hypercom Network Systems
- Memotec Communications
- Motorola Multiservice Networks Division
- Netrix Corp.
- Newbridge Networks
- Nortel Networks
- Nuera Communications
- RAD Data Communications
- Sync Research
- Telco Systems
- TimePlex Group
- Verilink Corp.

The FRAD is dead. Long live the FRAD!

Frame relay use is growing, but the number of frame relay access device (FRAD) products is shrinking. As we surveyed the current state of the art in FRADs, we noticed a significant trend toward the consolidation of multiple WAN functions, including frame relay packet assembly and disassembly, into one hardware device — typically a router. Vendors are making upstream WAN devices more capable so you have to buy and connect fewer individual network components. ADC Kentrox, for example, didn't participate in our review because it has discontinued its FRAD and, early this quarter, will announce new network devices that combine frame relay and other functions into one box.

— Barry Nance

frame relay/ATM networks. It also allows users to buy the FRAD to fit into a frame relay network knowing that the FRAD will still be useful if that site is later served by an ATM link instead.

The latest FRADs seem to be designed for busier sites, with five vendors offering support for 10/100M bit/sec Ethernet LANs: Cisco, Memotec Communications, Netrix, Nuera Communications and TimePlex. All the other FRADs (with the exception of HT Communications' AsyncFramer, which doesn't support Fast Ethernet) still support just 10M bit/sec Ethernet for sites that put less demand on their LANs.

As frame relay has become more popular, FRADs have become more sophisticated to keep pace with user needs. Most of the FRADs surveyed include some form of dial backup to keep a site connected if the frame relay link fails; only HT's AsyncFramer, Newbridge Networks' 3609 MainStreet product and Nuera's F200ip don't. The devices also offer some form of data collection to keep track of traffic in and out of sites. Reports based on that data help users track whether service providers are living up to the levels of service they promise.

With the addition of more new features to the simple frame relay assembler/disassembler, expect FRADs to become sophisticated edge devices that may deserve to be called more than just a FRAD.

Greene is a senior editor with Network World. *He can be reached at tgreene@nww.com.*

A FRAD for every outpost

The Colorado Rapid from Ericsson Datacom Access earns our Blue Ribbon Award for its speed and scalability .

By Barry Nance

REVIEW

Simple devices, subtle distinctions. That's what we found when we took a look at the midrange FRAD market.

We tested four FRADs in the $1,500 to $4,500 range that could carry multiple protocols (TCP/IP, IPX and SNA) between geographically distant Ethernet segments. Voice capability was optional. All four products performed well, but Ericsson Datacom Access, which acquired Advanced Computer Communications in November, won our Blue Ribbon Award. Ericsson's Colorado Rapid device delivered the most consistent performance across variously scaled setups, though it wasn't as easy to administer as ACT Networks' two contenders, the NetPerformer SDM-9350 and SDM-9400. ACT gained the administrative edge with its ACTView 2000 network management software, which ACT bundles for users of Hewlett-Packard's OpenView. In the installation race, FastComm Communications' EtherFRAD F9200 was the easiest to get up and running. (We invited other market share leaders Motorola, Nortel Networks and Cisco to submit their FRADs for review, but each declined our invitation.)

For the most part, our tests didn't reveal anything unusual. Each of the FRADs provided more than adequate bandwidth for the branch office WAN connections we established, and we found the FRADs no more difficult to administer than any other processor-based network component. We would have no qualms about putting any of them to use in a branch office frame relay environment.

The speed with which these devices rearranged network data into frame relay cells depended heavily on the processing power and amount of available memory in each device. All three vendors offer a range of FRADs for different applications. We found we could buy what we needed just by giving each vendor an accurate picture of the amount and type of network traffic we expected each permanent virtual circuit (PVC) to carry.

WAN links that zing

In the lab, all four devices transferred uncompressed data files via frame relay at about the same rate. When we enabled compression on a 56K bit/sec link, however, Ericsson's Colorado Rapid FRAD easily outran the competition, thanks to its efficiently programmed proprietary compression scheme. But the downside of Ericsson's compression approach, which is modeled on the Stac LZS algorithm, is that it forces you to use Ericsson FRADs at both ends of the WAN link, eliminating any chance of FRAD interoperability. We were also disappointed to find that we couldn't take advantage of compression in our high-speed connections. At T-1 and E-1 speeds, the time it took to compress each network packet caused a bottleneck with all the FRADs we tested.

With uncompressed data, Ericsson's Colorado Rapid and ACT Networks' SDM-9350 processed IPX packets slightly slower than TCP/IP or SNA packets. In low-speed tests, FastComm's EtherFRAD handled IPX packets well, but its IP performance wasn't quite as fast as that of the SDM-9350.

Product: Colorado Rapid

Vendor: Ericsson Datacom Access

NetworkWorld Blue Ribbon

The Colorado Rapid FRAD from Ericsson Datacom Access lives up to its name, outpacing the competition and taking home our Blue Ribbon Award.

Score Card

	Performance (35%)	Manageability (25%)	Standards support (10%)	Scalability (10%)	Installation (10%)	Documentation (10%)	Total score
Colorado Rapid (Blue Ribbon)	8 x .35 = 2.80	6 x .25 = 1.50	8 x .10 = 0.80	8 x .10 = 0.80	7 x .10 = 0.70	8 x .10 = 0.80	7.40
NetPerformer SDM-9400	6 x .35 = 2.10	8 x .25 = 2.00	8 x .10 = 0.80	7 x .10 = 0.70	6 x .10 = 0.60	7 x .10 = 0.70	6.90
NetPerformer SDM-9350	6 x .35 = 2.10	8 x .25 = 2.00	8 x .10 = 0.80	6 x .10 = 0.60	6 x .10 = 0.60	7 x .10 = 0.70	6.80
EtherFRAD F9200	6 x .35 = 2.10	5 x .25 = 1.25	8 x .10 = 0.80	6 x .10 = 0.60	8 x .10 = 0.80	6 x .10 = 0.60	6.15

Individual category scores are based on a scale of 1 to 10. **Percentages** are the weight given each category in determining the total score.

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ComNet Booth #1038

Visual Networks®, Inc. develops WAN service level management systems for frame relay, ATM and IP networks. The company's Visual UpTime® system provides instrumentation for network performance measurement and analysis, allowing network service providers to achieve required service levels and lower operating costs. Visual Networks' headquarters are in Rockville, Maryland.

All efforts have been made to make this listing as complete and accurate as possible. *Network World* is not liable for errors or omissions.

The SDM-9400 transferred uncompressed packets just slightly faster than the other three devices.

The ACT Networks devices did a superior job of carrying digitized voice signals across the WAN link when we simultaneously sent data and voice across the link. Moreover, the SDM-9350 and SDM-9400 let us concentrate frame relay traffic from multiple FRADs onto a single frame relay connection, which meant we needed fewer PVCs to carry our data.

We found all the units scaled well across a variety of branch office WAN links with different traffic requirements. As we emulated widely different branch office environments, we found Ericsson's Colorado Rapid gave us the most consistent throughput regardless of the mix of traffic volumes and protocol types we imposed on each frame relay link. For its part, the SDM-9400 didn't even break a sweat when we forced it to handle a 75% utilization load at T-1 speeds. The EtherFRAD wasn't as consistent across extremely wide ranges of utilization, yet it behaved well within the confines of small to mid-size branch office use.

Net Results

Network World Blue Ribbon

	PROS	CONS
COLORADO RAPID *Ericsson Datacom Access* *(800) 444-7854, (805) 685-4455* *www.acc.com/internet/products/colorado/colorado.html* *$3,295 to $4,295*	▲ Good performer	▼ Complicated telnet interface
NETPERFORMER SDM-9350 AND NETPERFORMER SDM-9400 *ACT Networks* *(800) 367-2281, (805) 388-2474* *www.acti.com/welcome_pages/NetPerformer.htm* *$2,995 for SDM-9350 and $4,250 for SDM-9400*	▲ Easy to administer via HP OpenView ▲ Excellent voice support	▼ Telnet administrative interface needs work
ETHERFRAD F9200 *FastComm Communications* *(800) 521-2496, (703) 318-7750* *www.fastcomm.com/data_frads.html#EtherFRAD* *$900 to $2,000*	▲ Good support for remote installation ▲ Easy installation	▼ Limited address filtering ability ▼ Subpar documentation

FRAD management

Ease of administration is nearly as important as performance when you're choosing a FRAD.

ACT's ACTView 2000 network management software turned the maintenance and monitoring of the SDM-9350 and SDM-9400 into child's play. In the lab, it gave us an intuitive graphical interface for observing the real-time behavior of SNMP-capable FRADs. If you use OpenView, the combination of ACT's FRADs and management software slides easily into your network. However, network administrators who don't use OpenView will find themselves referring to the user manual frequently as they configure the SDM-9350 or SDM-9400 through its telnet interface.

All four FRAD devices let us perform configuration tasks through a separate port, via telnet, as well as in-band over the network. The EtherFRAD F9200 telnet interface was simplest and easiest to use, while Ericsson's Colorado Rapid telnet interface was somewhat complicated though comprehensive. Ericsson's supplies a wealth of configuration options, including detailed data filtering at the Data Link Connection Identifier, which allows you to identify each PVC, to use bandwidth judiciously between remote sites.

In our tests, we configured Ericsson's Colorado Rapid to filter IP and IPX traffic based on source/destination, subnet mask and other criteria. The SDM-9350 and SDM-9400 also let us configure IP address filters, via ACTView 2000, but the EtherFRAD's filtering ability was limited. Nonetheless, the EtherFRAD's Fastick modules automatically distinguished between Data Terminal Equipment and Data Communication Equipment, a feature that helps reduce cable setup problems. We liked the EtherFRAD's option of letting us toggle its integrated T-1/E-1 DSU/CSU on and off according to the speed of the link we established. FastComm's design offers multiple ports for routing over frame relay and most common serial-based routing protocols — a big advantage for growing networks that require reconfiguring over time.

As for supporting standards, our tests showed all four FRAD products adhere to the RFC 1490 frame relay standard. As long as we didn't turn compression on, the products interoperated well. We were especially pleased to see units from different vendors successfully exchange IPX routing (Routing Information Protocol) traffic, SNA traffic and several types of IP traffic, including Address Resolution Protocol and Internet Control Message Protocol.

After working with these FRADs, we concluded that most users will have to develop custom network-specific setup instructions if they plan to deploy dozens or hundreds of devices in an enterprise setting. The documentation the vendors provide is just too general for most users. This is particularly true in the case of FastComm, which attempts to cover several different EtherFRAD models in one booklet. ACT's SDM-9350 and SDM-9400 user guides were product-specific and did a good job of explaining frame relay concepts. Of the three vendors' manuals, Ericsson's Colorado Rapid manuals were the most thorough.

Getting all these units up and running was simple enough after we decoded the manuals, but the EtherFRAD pleasantly surprised us with the quickest, easiest installation.

The straightforward, clean design of the EtherFRAD's remote telnet configuration screens makes it an ideal candidate for use at small remote sites that you never expect a network administrator to visit.

We were amazed to find that we could probably send an EtherFRAD to a remote site, have an untrained clerk or assistant make some simple network cable connections while we supplied over-the-phone guidance and then put the EtherFRAD to work after making some configuration changes remotely over the network.

It's just this kind of simplicity that reminds us why users migrate from expensive point-to-point lines to frame relay. Check with vendors; more likely than not there's more than one FRAD out there that can handle the traffic you expect each PVC to carry.

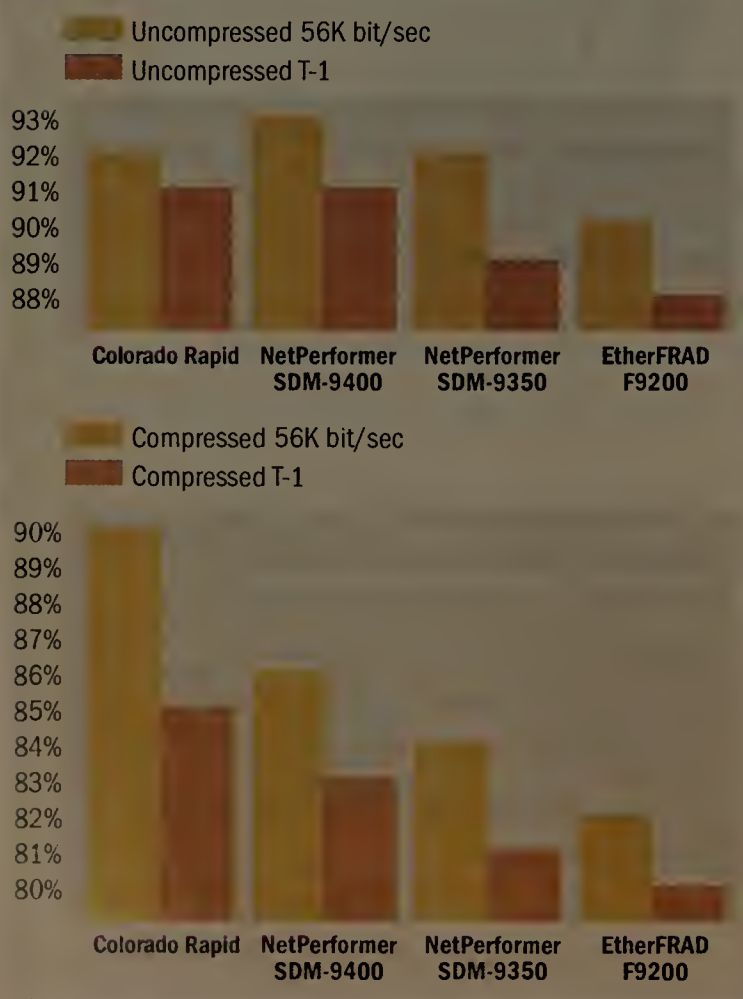
Get more online:

- **How we did it.**
- **Our frame relay and voice over frame relay audio primers.**
- **News from the Frame Relay Forum.**

Nance, a computer analyst and consultant for 28 years, is the author of Introduction to Networking, 4th Edition *(Que, 1997) and* Client/Server LAN Programming *(Que, 1994). He can be reached at barryn@erols.com.*

FRAD PERFORMANCE

We measured throughput as a percentage of available bandwidth by averaging IPX, TCP/IP and SNA traffic results.



FEATURE

GLOBAL VPN USES WEB TECHNOLOGY TO UNITE RESEARCHERS AND TRADING PARTNERS ONLINE.

Merck writes a Web-based Rx

By Neal Weinberg

When it comes to keeping its research team in touch, pharmaceutical giant Merck has found that the World Wide Web is the best medicine.

The company's global Internet-based virtual private network (VPN) has transformed the way Merck scientists collaborate on research projects, enabling anyone with the right credentials to access vast databases of resources with point-and-click ease. Additionally, the network has opened up secure lines of communication with business partners, laying the foundation for more productive collaboration.

In the two years since its debut, the number of users of Merck's Web-based PartnerNet network has more than doubled — from 4,600 to 9,800 — and volume has quadrupled. Today, daily traffic averages 30G bytes, with peaks as high as 50G bytes. Inside Merck, 8,000 workstations have been Web-enabled, and the company is poised to deploy future applications in an HTML, Java or JavaScript format to make them accessible via the Web, perhaps paving the way to a migration toward a type of network computer or information appliance.

Before PartnerNet, "We had no real capability to share information in real time against a core repository," says Clark Golestani, director of research information systems computing infrastructure at the New Jersey company. Merck scientists around the world were sharing information with one another and third-party research partners by mailing floppy disks. In an industry in which a company's success or failure depends on whether it gets drugs to market first, Merck knew it had to find a better way.

Golestani and his team spent six months building PartnerNet. Without disclosing the cost, he says a company of Merck's size — $24 billion in annual sales and 53,800 employees — could build a comparable VPN for less than $1 million.

Golestani adds that he never had to justify the cost to management because the benefits were so readily apparent, especially in terms of speed and security.

Dr. Martha Quesada, director of Merck's scientific information systems, says there's no comparison between the speed and efficiency that can be realized through PartnerNet vs. the old methods.

Merck designed the system so that all data for a given project sits on a single server, enabling all scientists involved to work from a common project database, regardless of their location. Once a scientist posts information in this centralized Lotus Notes database, it is immediately accessible to the other scientists, Quesada says.

Building the beast

A key challenge Golestani faced in building PartnerNet was keeping unauthorized users away from all that data. The solution was the Merck PartnerNet Gateway, Golestani's term for a multitiered collection of security facilities, including firewalls, encryption, router filtering and token-based authentication.

To ensure users are who they say they are, Golestani uses SecurID from Security Dynamics Technologies. The system requires users to enter a name and password along with a number generated by the SecurID token. The number changes every 60 seconds and must be validated against a server-based component.

JOHN RAE

In building Merck's PartnerNet global VPN, *Clark Golestani adhered to three guiding principles: security, flexibility and standards.*

To protect its data over the Internet, Merck uses one of two options, the IP Security (IPSec) protocol for network-layer encryption or a Unix-based protocol called swIPe that provides firewall-to-firewall encryption. Golestani also has configured external routers to send data to a specific port on his gateway router. If an intruder knocks on the wrong router door, a filter blocks him out.

Once a user successfully navigates through the various PartnerNet Gateway components, he is directed to a server that controls access to specific applications based on the user's identity. So, for example, a researcher at a Merck partner site may only be authorized to access a single Notes database, but a Merck employee would have access all the way into the company's crown jewel, its core research database. That Oracle database acts as a repository for all the research information the company has gathered over the years.

One of the most important aspects of building PartnerNet was sticking to industry standards, including TCP/IP, HTML, IPSec and Simple Mail Transfer Protocol.

For example, instead of trying to get the various Merck departments to standardize on one e-mail system, Golestani has the company's platforms — Microsoft Exchange, Microsoft Mail, Quick Mail, Unix Mail and a VAX-based mail system — feed into a single SMTP hub.

Catching fire

Thanks in part to this kind of flexibility, when PartnerNet was rolled out to the research labs, it quickly captured the attention of the rest of the company. Merck's sales, marketing and financial departments began using PartnerNet to share information internally.

The next step was to use PartnerNet to establish secure lines of communication with more than 15 suppliers and customers for e-mail exchange and access to parts of Merck's sales and marketing databases. Merck is also using PartnerNet as the gateway that controls access to the company's internal code, so offsite Y2K consultants can get to the software that needs fixing.

This year Golestani plans to enable customers and partners to conduct transactions with Merck via PartnerNet, cutting loose some private electronic data interchange links currently used for sending and receiving orders. Golestani also wants to establish PartnerNet-based communications between Merck and its Medco pharmacy services division.

As the volume and importance of data moving across PartnerNet increases, so does the need to upgrade the security. Golestani says he is looking at adding Secure Multi-purpose Internet Mail Extensions for secure messaging and considering implementing public and private keys.

He also wants to provide remote access to PartnerNet for scientists working outside of the lab sites and to extend the management framework to include application-level monitoring.

Golestani says the exciting part of the PartnerNet experience has been watching the VPN expand from something that was targeted at the company's research division to a platform that is changing the way the entire company does business. "It's exploding," he says. ■

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Management Strategies

Starting over

Eager to help fill the IT labor void, retrained workers are forging careers in networking.

By Neal Weinberg

After 15 years on the police force, Debbi Atkins was ready for a safer career. So the single mom studied Windows NT for several months and then traded in her badge and gun for a keyboard and mouse.

Atkins earned her Microsoft Certified Systems Engineer (MCSE) certification last January and landed a job as network administrator at wireless service provider MobileStar Network in Richardson, Texas. The former cop is happy she moved from law enforcement to LAN enforcement. The work is enjoyable and the pay is good, she says. Plus, "it's a lot safer, and there's a lot less stress."

David Jackson, MobileStar's IS director, says Atkins has become a valuable part of his team. Whatever she lacked in technical skills, she more than made up for in people skills and maturity.

Atkins is just one of thousands who made a career switch to IT last year. Many of these professionals were drawn by the well-publicized availability of jobs and the growing number of programs targeted at retraining workers from other fields. Whatever their reasons for changing careers, these people can help you fill some of your entry-level IT positions.

Statistics on the total number of retrained workers entering the IT field are hard to come by. The U.S. Department of Labor, the primary source of government funding for displaced workers, received $1.2 billion for training in 1998. That money was parceled out to 600 field offices, which set up programs based on local employment conditions.

There's no way to tell what percentage of those funds went to IT training. However, the agency last year earmarked $7.5 million to fund 11 small demonstration programs aimed at moving people into technology careers.

Along with the Department of Labor, the Information Technology Association of America (ITAA) and Microsoft are also emerging as major proponents of IT training efforts. The Department of Labor typically supplies funding, ITAA provides the link to industry groups and Microsoft pushes education and training through its Skills 2000 program, which includes educator training, student loans and career expos.

The three organizations are working together on an effort now underway in New Jersey, Texas and Virginia to begin a training program for people with disabilities. The program is a replica of one from the Community College of Denver.

Another focus is on retraining older workers. In 1998, Microsoft invested $350,000 in a joint project with the Green Thumb nonprofit organization to train low-income people aged 55 and over for high-tech jobs. Last month, the Department of Labor said it was kicking in $800,000 to expand the program to 11 more locations.

Former cop Debbi Atkins *now polices the network at MobileStar, where her boss David Jackson says she's a valuable asset to the IS team.*

PAUL BUCK

Green Thumb helped prepare Carole Watson-Cooley for a technical support position at Dell Computers in Round Rock, Texas. The 58-year-old was laid off from her job as a pharmaceutical researcher in 1996 and moved from upstate New York to Texas in search of a sunnier job climate. She was sending out as many as 50 resumes per month and making little progress when she chanced upon a Green Thumb flyer.

Through the program, Cooley took a six-week Microsoft Certified Technician course, revamped her resume and quickly found herself answering technical questions in front of a Dell recruiter. Within a week, Dell hired her to answer help desk questions from consumers and small business customers. Her goal is to work her way up to a network management position.

"I always wanted to work with computers," says Cooley. "This is one of the most rewarding experiences of my lifetime."

Employers who participate in these programs can't fill all of their open positions with retrained workers, but every little bit helps. Retraining is one way Dell is trying to build its workforce, says Michele Glaze, a corporate spokeswoman.

AboutReady Interactive, a Web site development firm in Boston, hired a worker through the Massachusetts Software Council's Fellowship Program for an entry-level HTML programming job.

John Francis, managing director of AboutReady Interactive, says such training is "a great way to transition people from traditional industry sector jobs to the information age." He adds that what retrained workers lack in technical skills, they compensate for with a new point of view.

One key to a successful retraining program is a strong tie with the local business community. For example, the Computer Training for People with Disabilities program in Denver has a business advisory council that helps set the curriculum. Council members visit the classroom several times per year, and students complete a two-month internship with a participating employer.

Kevin Ellerman, a 1987 program alumnus and now program director, says 200 people with physical disabilities have graduated from the program since its inception 17 years ago. The initiative combines computer training in areas like LAN administration with adaptive technology, such as voice recognition software and screen readers.

Of course, another factor that determines whether people will successfully make the transition to IT careers is their own level of motivation.

Rob Calkins is a perfect example of determination. He was working as an operations manager for a video production company when he saw Green Thumb's computer training classes advertised in a Sacramento, Calif., paper. Calkins was looking for a career change and had always been interested in computers.

He recently took an eight-week class that covered standard desktop programs, network basics and Windows NT administration. Calkins now works as an intern at a small company, but he plans to complete his MCSE certification soon and land a full-time job.

"I should be able to weasel my way in someplace," he says. "I may be 59, but I'm a go-getter."

Weinberg is Network World's *features reporter. He can be reached at nweinberg@nww.com.*

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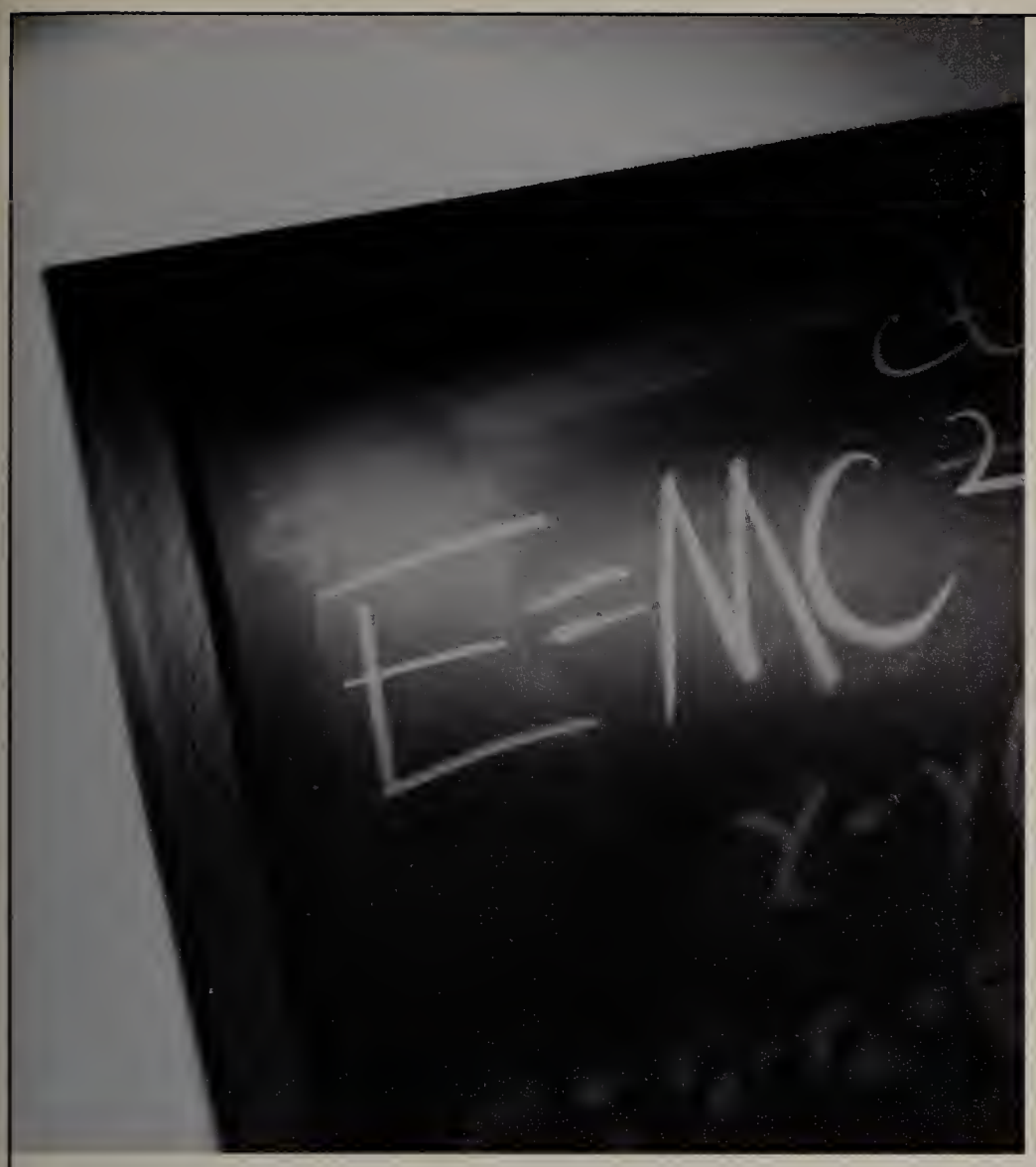

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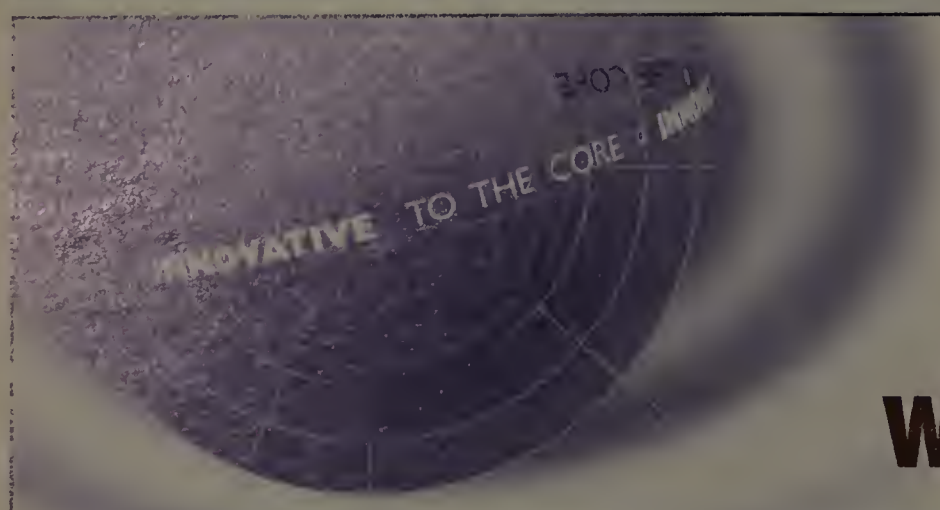

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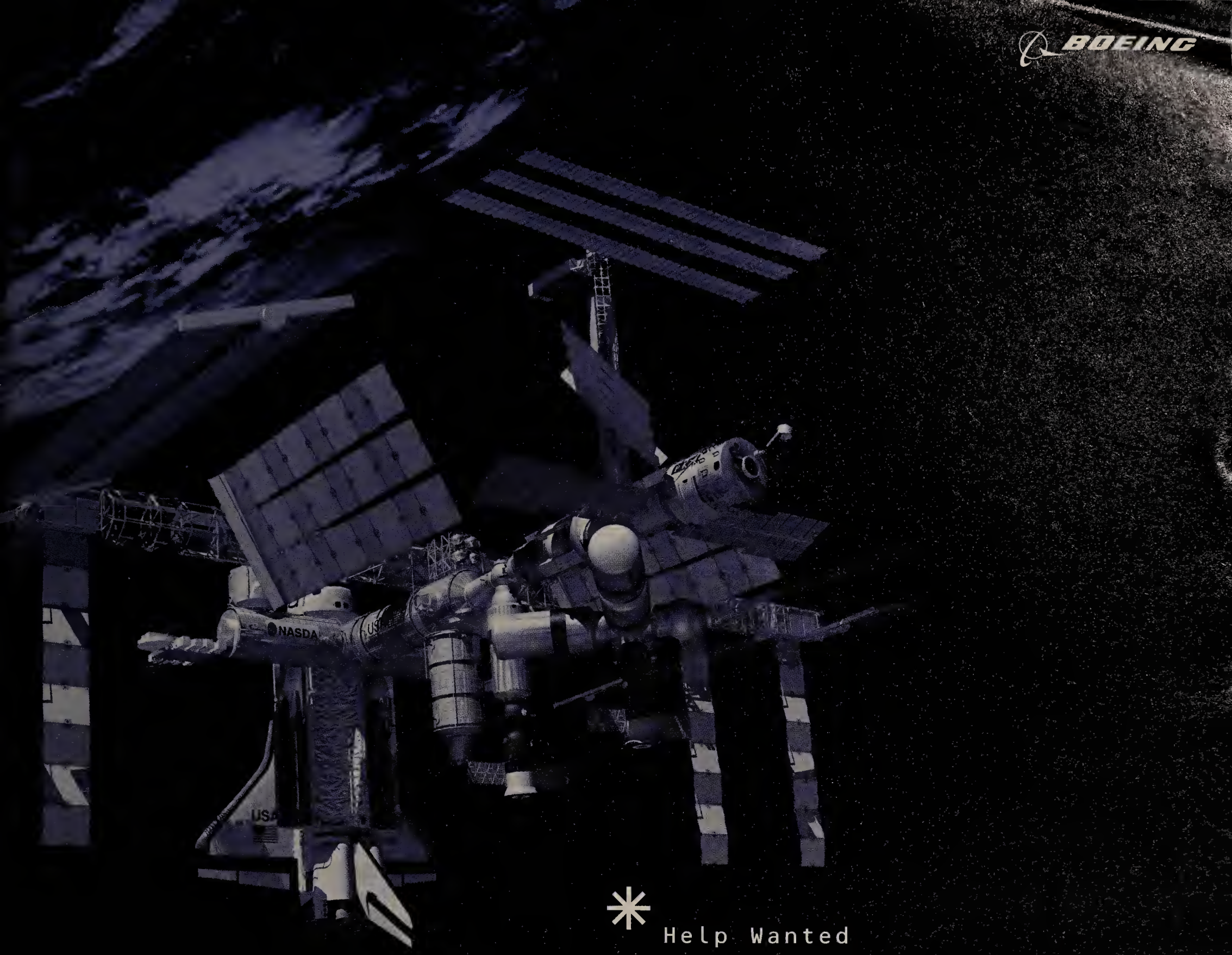

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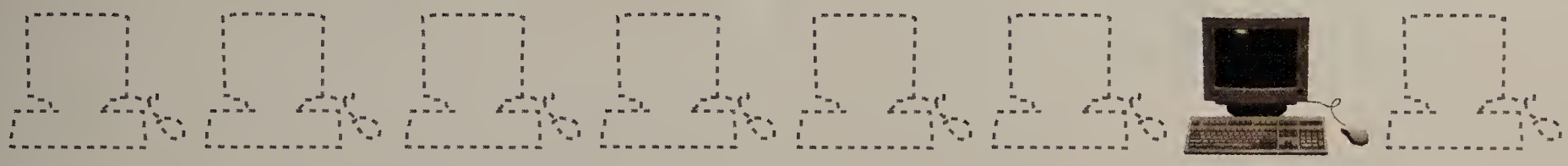

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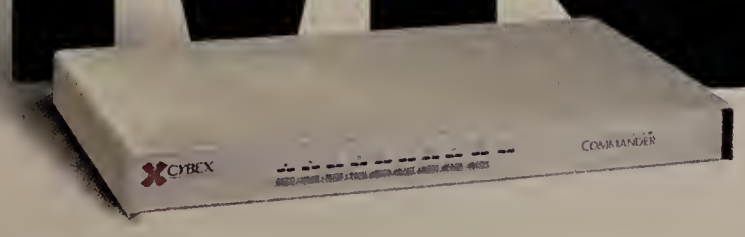

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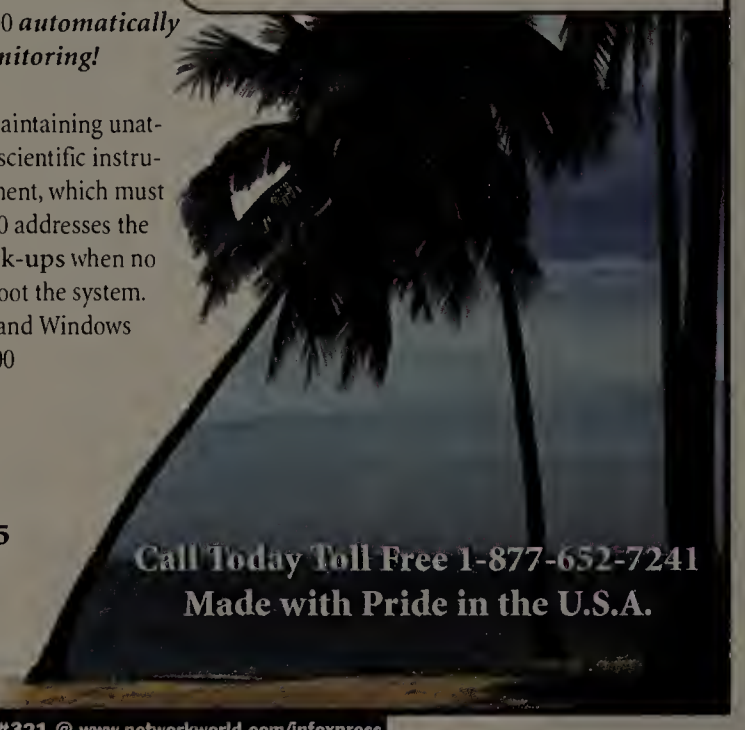

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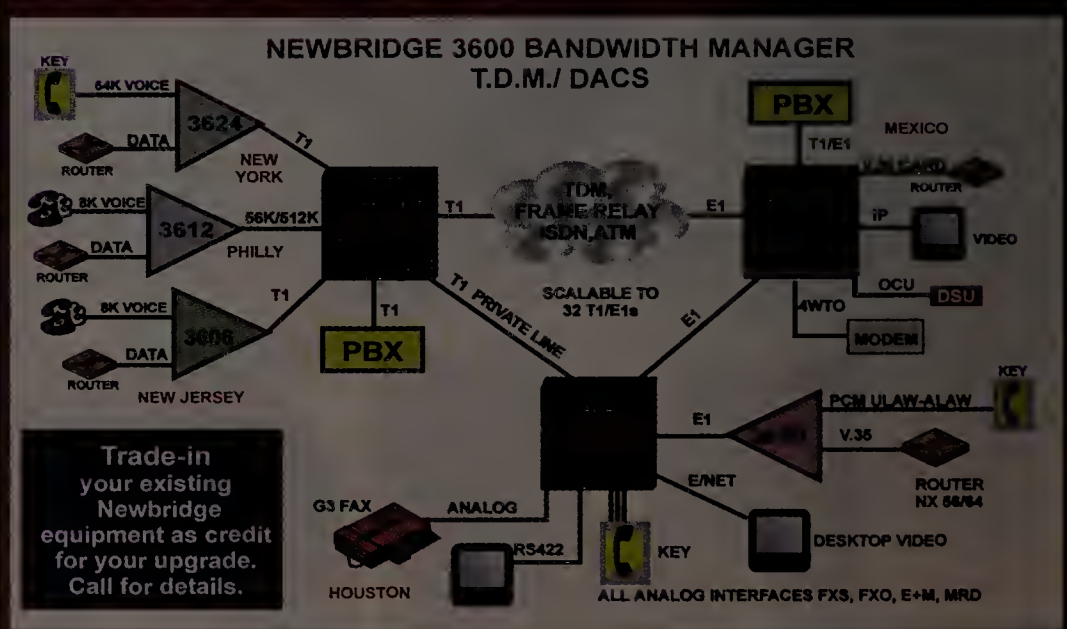

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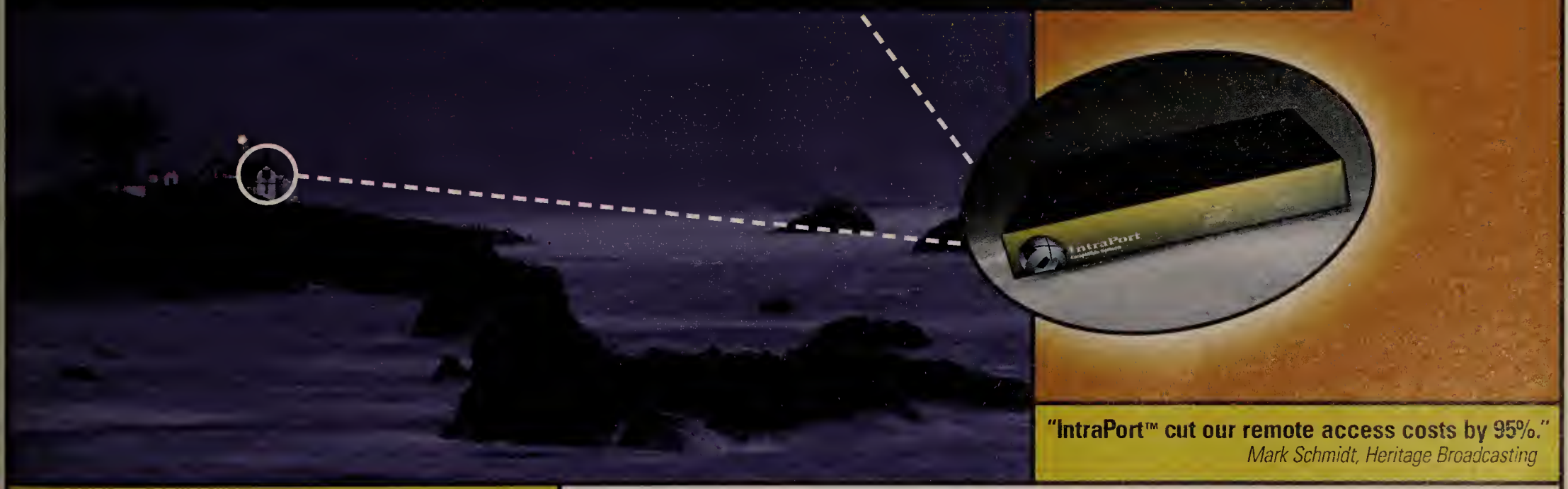

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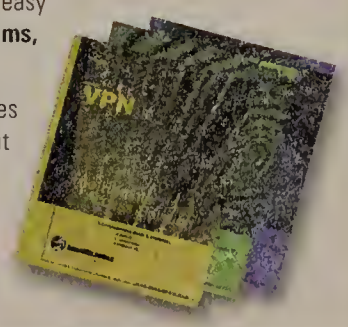

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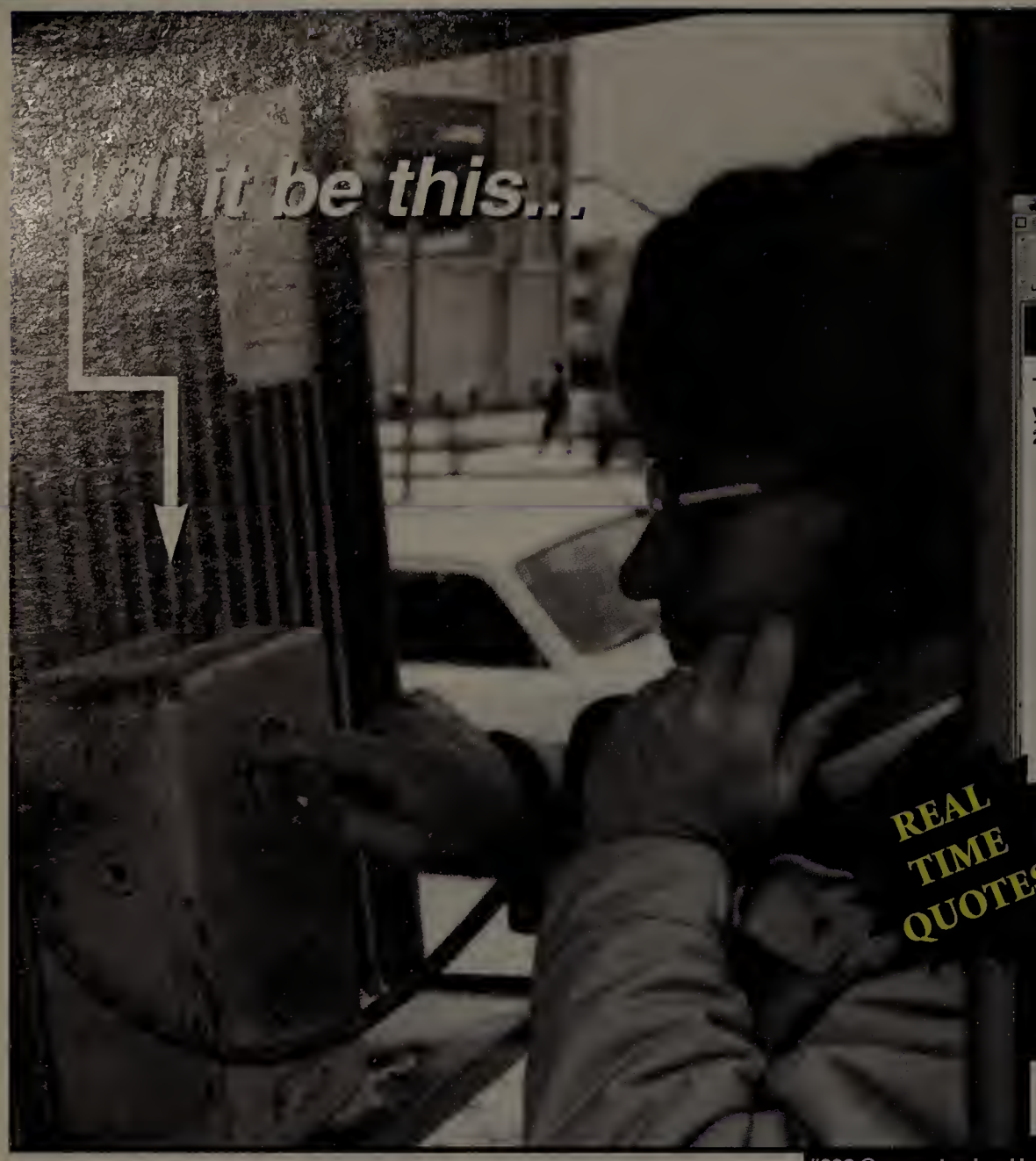

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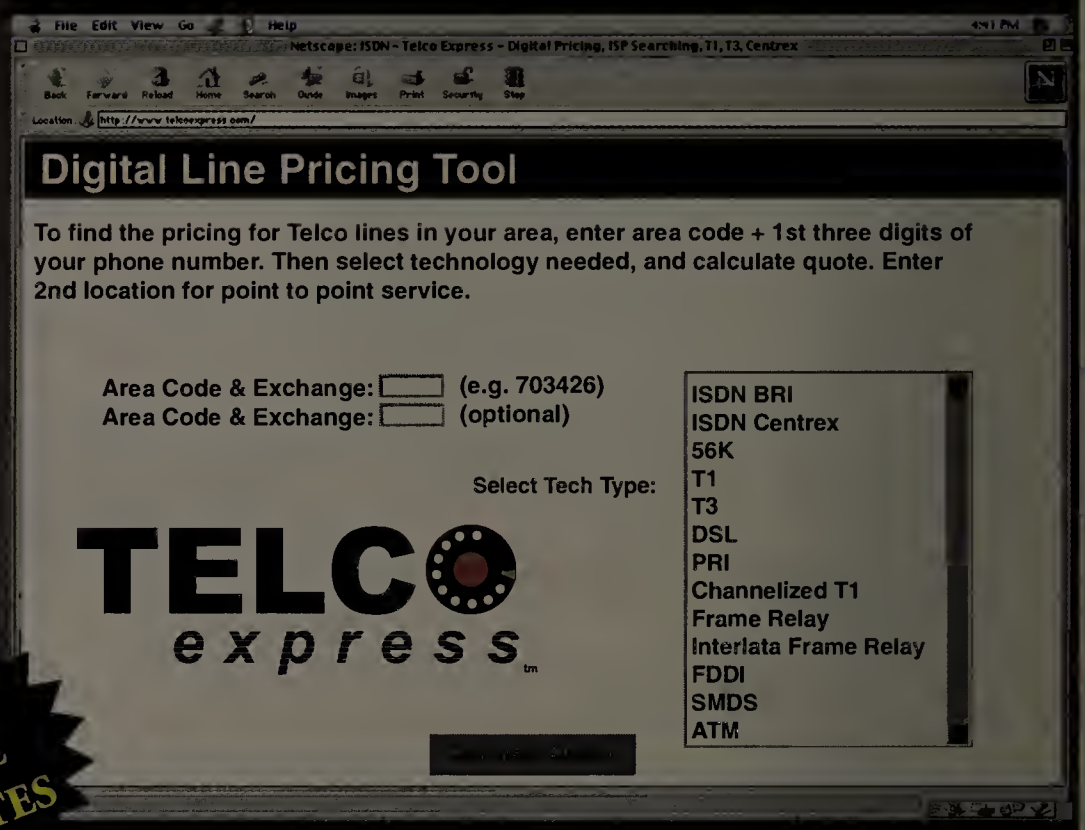

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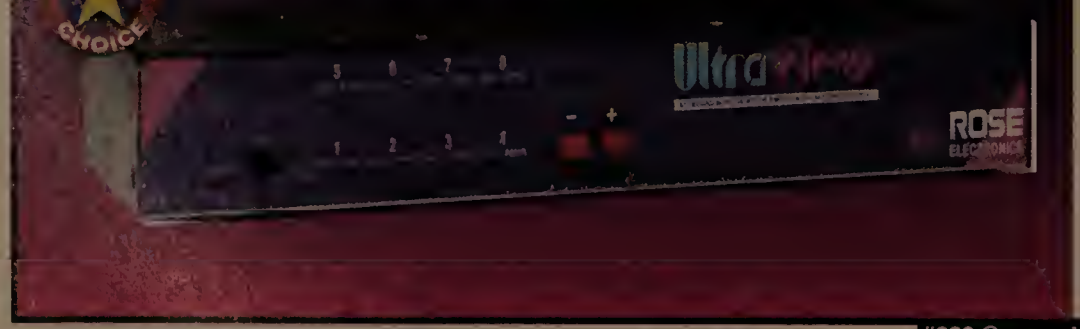

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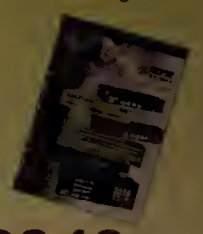
On-screen display menu–This screen shows the overlay menu with the selection for the color scheme popped up.



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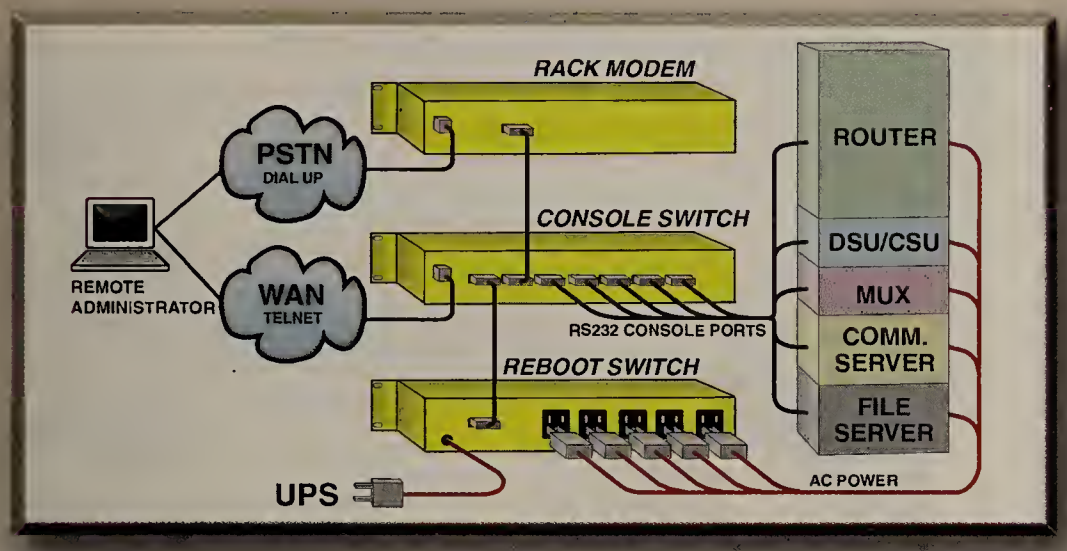

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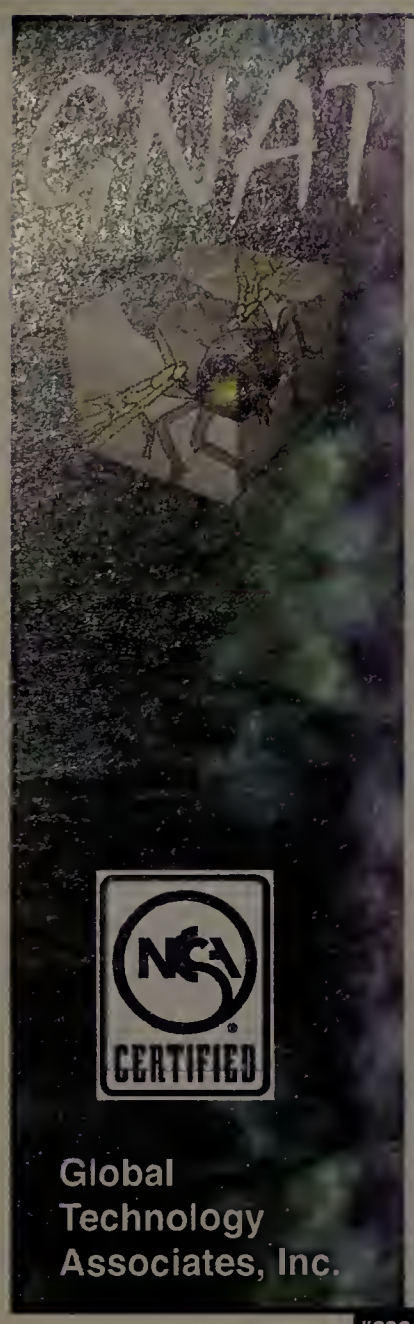

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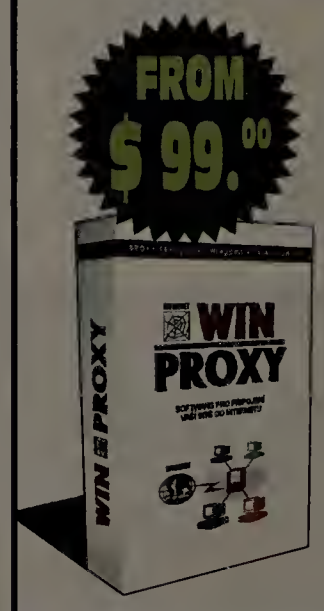

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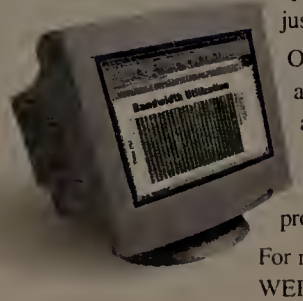

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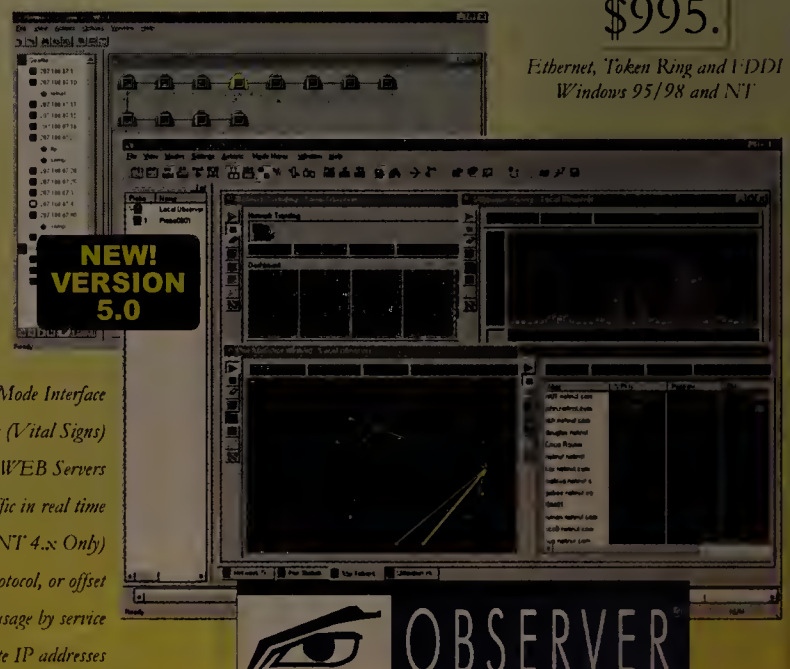

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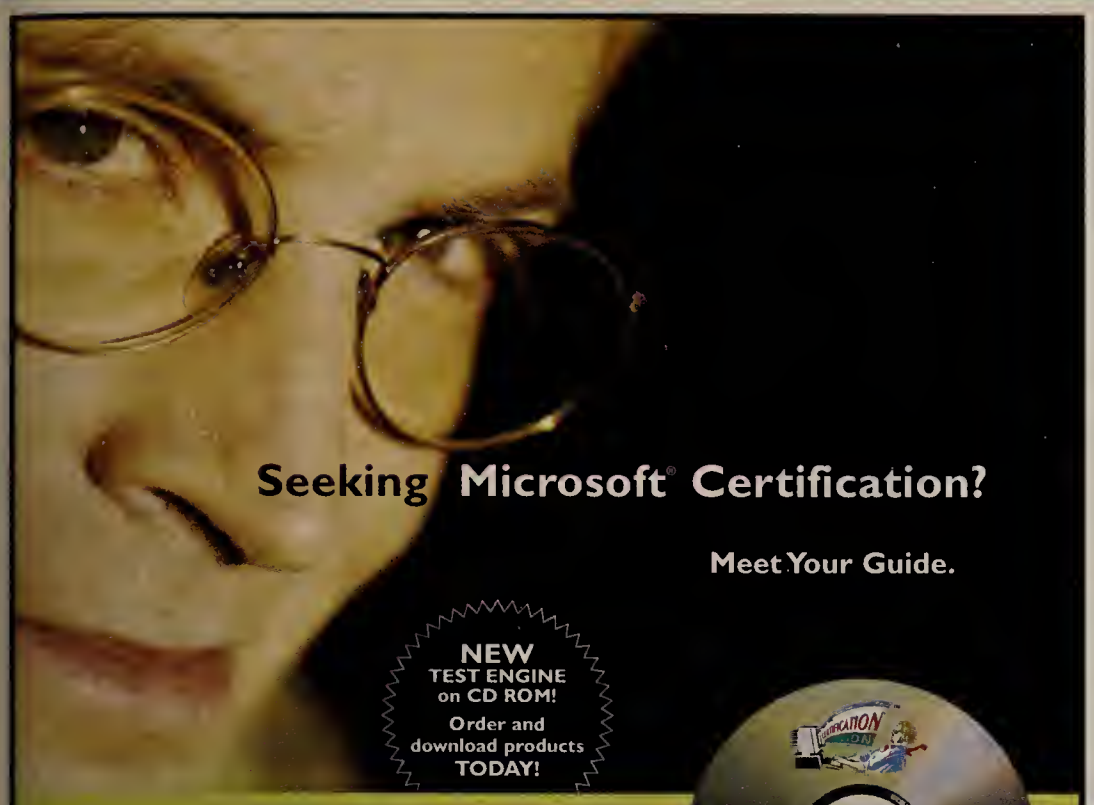

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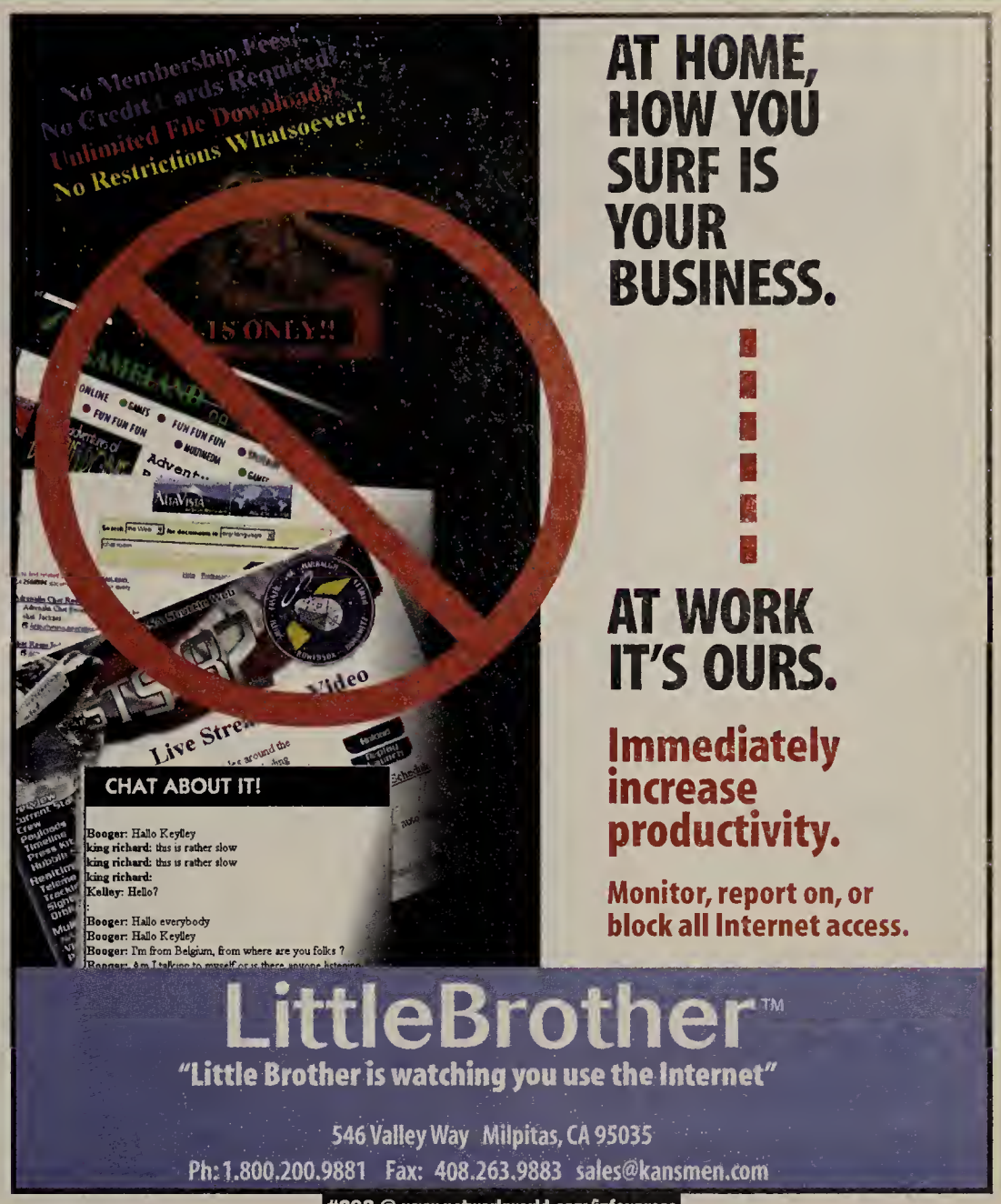

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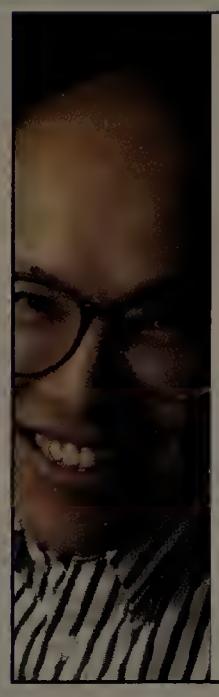

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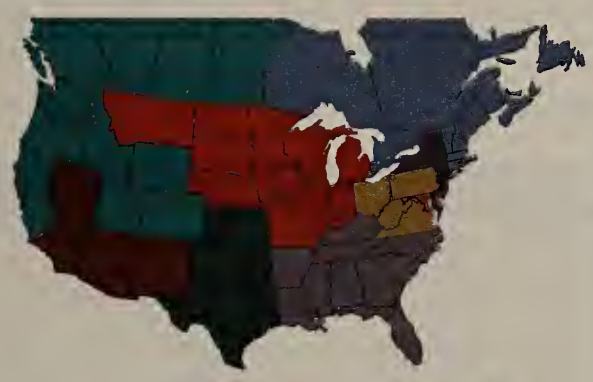

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Wireless LAN phone handles voice and data

Symbol Technologies to target retail, health care and other vertical markets with multipurpose 8-ounce device.

By John Cox
Hollsville, N.Y.

A new handheld device lets users such as warehouse workers, retail inventory clerks and doctors stay connected through voice and data communications on a wireless LAN.

Symbol Technologies, Inc.'s NetVision Data Phone uses voice-over-IP software for telephone calls. But the compact, 8-ounce device also includes a miniaturized bar-code scanner, data-entry pad, Web browser and serial printer port.

The phone runs over Symbol's Spectrum24 wireless LAN, which interconnects the handsets for voice calls and gives them access to local application and data servers.

Spectrum24 is based on the 802.11 wireless standard, which uses the unlicensed 2.4-GHz ISM frequency.

Roaming *workers can make voice calls and access data via the NetVision Data Phone.*

Dual purpose

The phone is being unveiled this week at the National Retail Federation Show in New York.

"The product is a really impressive technological feat," says Gerry Purdy, president of Mobile Insights, a company that researches the wireless market.

"It's a handset for voice and intercom communications and a data device for information-based decision making," Purdy says.

The idea for the NetVision Data Phone came from a major Symbol customer, which the vendor declined to identify.

The customer, one of the country's biggest retailers, bought the original NetVision Phone, which offered only voice communications packetized for the wireless IP LAN. The retailer suggested adding the bar-code reader and Web browser.

The device is manufactured to Symbol's design specifications by Sanyo.

While Symbol's current wireless LAN customers are the company's initial targets for NetVision Data Phone, the company will try to sell the product to companies in various vertical markets, which will be able to customize the product for their individual needs.

NetVision Data Phone has a list price of $1,695, but a Symbol product marketing manager says that the average system price will be about $1,200.

The voice-only wireless phone costs $700.

✆ Symbol: (800) 927-9626

DTM

Continued from page 1

backers of the new technology have much work ahead of them.

It may be up to a few start-ups to get the word out. One of the firms, Effnet, Inc., will put DTM interfaces on an upcoming router, one that fits on a card that can go in a Web server (see story, below).

The two other Swedish start-ups are focusing more heavily on DTM itself. Dynarc, for example, last month introduced a DTM switch for enterprise networks into the U.S. market. This spring, the company plans to unveil a carrier-class version aimed at metropolitan-area networks (MAN).

And Net Insight this month will install its first U.S. DTM pilot network at ICG Telecom Group in Denver. Net Insight soon plans to introduce access devices for aggregating voice and data from enterprise networks onto citywide backbones.

DTM is a network architecture based on circuit switching, but with a twist. It can dynamically reallocate time slots, which means it can support real-time applications as well as bursty traffic such as IP.

Built on a fiber-optic ring in a corporate network or MAN, DTM can operate at very high speeds, with initial interfaces starting at about 1G bit/sec.

DTM, which has been in development since the early 1990s, also handles multicast traffic well.

ATM was designed to handle multiservice networks as well, but critics say it may not be the best-suited technology for all circumstances. "ATM is too complex to set up and tear down connections at a fast pace," says Olov Schagerlund, president and CEO of Dynarc. He also points out that ATM can't multicast easily because separate connections have to be established for every client receiving the multicast.

"We believe that IP/DTM could be implemented and maintained more cost-efficiently with the same or better functionality as the complex ATM/SONET stack," says Björn Pehrson, professor at the Swedish Royal Institute of Technology, where DTM was developed. The Royal Institute currently is working with Stanford University, experimenting with Dynarc DTM switches for videoconferencing and shared applications.

ATM, however, has a few advantages over DTM, says George Dobrowski, president of the ATM Forum.

DTM doesn't have access to intelligent network services like ATM does, he says. For instance, ATM can handle complex telephone call routing.

Dobrowski says that ATM is far ahead of DTM in implementation and availability.

"Is it justified to develop a new technology to replace what is already available?" Dobrowski asks.

ATM is also a standard, whereas DTM is a proprietary technology owned by Dynarc and Net Insight. Ericsson, which backed DTM's development, also owns several of the patents.

Getting the word out

DTM's biggest hurdle may be that few people have heard of it. The big-name internetwork companies contacted for this article, such as Cisco and Nortel Networks, couldn't even find spokesmen familiar with the technology.

On the other hand, many service providers are open to new technology, and the idea of changing horses in midstream may not be an issue. "Nobody's really on a horse right now," says Jennifer Pigg, senior vice president of data communications at Boston-based The Yankee Group.

The lack of DTM standards is probably not an issue in the short term, she adds. To avoid having the technology steered in a different direction by big network companies, the start-ups should keep DTM out of standards groups for as long as possible and focus on getting implementations in place, Pigg says.

Several high-speed routing firms in the U.S. are discussing the use of DTM technology within their routers as the internal architecture, Pigg says.

Dynarc's Schagerlund says the Swedish companies plan to take DTM to the International Telecommunication Union later this year for standardization, and will approach the Internet Engineering Task Force about standards for sending IP over DTM. ■

The other transfer mode technology

DTM may sound like ATM, but it has some marked differences:

	DTM	ATM
Switching technique	Circuit-based	Packet-based
Multicasting	Simple	Difficult
Delay	Constant	Variable or constant
Services defined	Few	Many
Signaling overhead	Light	Heavy
Standards	Nonexistent	Many defined, work ongoing

Start-up offers DTM and more

Newcomer Effnet, Inc.'s debut offering will do a little bit of everything.

This router on a card will fit into Web servers and feature a multitude of interfaces, including Dynamic synchronous Transfer Mode (DTM). The server card will also include firewall capabilities and quality-of-service functions.

The key to the product's performance is an algorithm that handles routing table lookups more efficiently by using far fewer operations and less processing time than most similar devices, says Jim Spoerl, president of the U.S. subsidiary of Effnet, based in Wellesley, Mass.

All of the card's components are general-purpose. Daughtercards provide a variety of interfaces, including T-1/E-1, T-3/E-3, ATM and DTM. Several router cards can be inserted in the same server, among them. As server bus speeds improve, so will the cards' performance.

The routers are intended for use with servers connected to the Internet, or as routers that connect an enterprise to the Internet. They are not designed to make LANs more efficient by subnetting, Spoerl says.

The company has not released pricing information.

— Jeff Caruso

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MCI WorldCom

Continued from page 14

timing of its customer transfer, *Network World* has learned that several hundred customers will be moved to UUNET's network by the end of March.

MCI WorldCom has not started the migration process, says John Scarborough, the carrier's executive director of virtual data services.

It may appear that MCI WorldCom's move has been prompted by MCI's agreement last year to sell its Internet business to Cable & Wireless USA for $1.7 billion.

Under that deal, Cable & Wireless earned the right to begin charging MCI WorldCom for use of the former MCI Internet backbone. Starting in April, MCI WorldCom will be charged the same rate as any carrier using Cable & Wireless network, a Cable & Wireless spokeswoman says.

MCI WorldCom would not discuss its Cable & Wireless relationship.

But MCI WorldCom says it is migrating its customers' Internet-bound PVCs to UUNET to give those customers more control over their Internet traffic and network connections.

ATM and frame relay customers will have the chance to sign up for UUNET's strong service-level agreements (SLA), Scarborough says.

UUNET's standard SLA guarantees 100% network availability, including the local loop connection.

The ISP promises that customers will not experience more than 85 msec round-trip latency over its domestic network and that they will be notified within 15 minutes of any network outage.

MCI WorldCom plans to move all of its data customers' traffic off Cable & Wireless' network.

However, Scarborough says if a customer doesn't want to migrate its traffic, MCI WorldCom is not going to force the customer to do so. ■

Linux SNA

Continued from page 1

porate it into Linux apps. An industry standard, tn3270 technology delivers SNA 3270 data over TCP/IP backbones.

New Linux SNA Drivers

Software that lets Linux users access SNA resources on the mainframe is available at samba.anu.edu.au/linux-sna/.

The software supports the following:

- **APPN** for advanced SNA networks
- **LLC2** for SNA token ring LAN communications
- **SNA LU 2** for traditional SNA links
- **Escon** for mainframe channel connectivity

Schulist, who is also president of ICE Networking Enterprises, a software firm, is working on Linux tn3270 server software and has already written Linux drivers for several 3Com and Sysconnect token-ring cards that are available now.

In addition, Bus-Tech, a mainframe connectivity vendor, will soon announce support for the tn3270 Linux package on its Enterprise Systems Connection Architecture (ESCON) cards. Bus-Tech's cards let a variety of server hardware connect directly to IBM's fiber ESCON channel. The combination will give Linux users high-speed access to SNA mainframe applications.

Schulist has also developed a Linux SNA version of ping software, which pings the server to validate that a network connection has been made.

A Linux tn5250 communications software package is also in the works that will let Linux users access AS/400 server resources.

Schulist says he's not sure if he'll charge a fee for any of his Linux distributions, nor what that fee might be.

Analysts say Linux-SNA connectivity is essential if Linux is to penetrate large enterprise networks, as Microsoft has done with its Windows NT SNA Server package.

"If Linux is going to be widely taken up within the data center environment, these types of communications features have got to come," says Mark Lillycrop, director of research at the Xephon consultancy in Newbury, England.

Other experts agree.

"People want to be able to survive with the working application as long as they possibly can," says Steven Mintz, president of JBM Electronics, a vendor of data communications devices that connect legacy protocol devices to the LAN and WAN.

Users need a way to bridge the gap between existing legacy applications and new applications, Mintz says: "I've had customers who've had applications for 25 years." ■

SGI

Continued from page 1

products.

So does SGI like Linux or not? Despite more than three weeks of inquiries from *Network World,* the question remains unanswered.

SGI seems to be making all the right Linux moves, but the company is reluctant to talk about them. In fact, SGI seems oddly defensive, and sometimes ambivalent, about its Linux efforts.

For instance, late last year the computer company became a sponsoring member of Linux International, a nonprofit association that works on the promotion and growth of Linux. SGI wrote a press release about its membership, but then tried to retract it after it was posted on Linux International's site (www.li.org). The organization has refused to remove the SGI document from its site.

When contacted about this, SGI officials said they had no official comment on Linux involvement. One source, however, says the company did not want to appear to be copying Sun, which made a big Linux splash in December when it promised to port Linux to UltraSPARC.

After a series of follow-up calls, *Network World* spoke with Dave McAllister, SGI's representative to Linux International. McAllister acknowledged the existence of an engineering-led, SGI-sponsored Linux mailing list, whose members have been porting Linux to different SGI machines for more than two years. McAllister offered little else on SGI's interest in Linux or the company's overall strategy.

Despite grass-roots *development, SGI is coy about Linux on its hardware.*

SGI's server product line manager, Ben Passerelli, only added scant details to McAllister's description of SGI's Linux activity.

SGI's official interest in Linux was short-lived — it peaked early and seemingly waned quickly after. In summer 1996, the company hired an intern to port Linux to SGI's Indy workstation. The intern, who also ported Linux to Sun's SPARC, left soon after finishing the kernel part of the SGI/Linux port. The company has not filled this Linux position.

A grass-roots effort within SGI has paid off. Volunteers have finished porting Linux to SGI's Indy machine, and their attention has now swung to other SGI devices, including SGI's newest box, the Visual Workstation, which runs Windows NT Workstation software. Linux also runs on SGI's Origin200 server.

The Linux mailing list, which is active today and counts SGI employees as one-quarter of its members, grew out of the project porting Linux to Indy. Having nearly completed the port on SGI's Indy, dubbed HardHat 5.1, early in the summer of 1998, others on the list moved on to the SGI's Indigo workstation, the Visual workstation and other units, including the Indy and Indigo, which are not current-technology machines.

SGI, the silent partner in this deal, has aided this mailing list by supplying a Web site (www.linux.sgi.com), hardware, documentation and equipment, but many folks in corporate SGI don't know anything about it.

SGI's Passerelli confirms that Linux runs on various SGI machines, such as its current Origin200 server, as well as its Visual Workstation, announced last week. And without offering a strategy or official endorsement, Passerelli praises the up-and-coming operating system. "We are looking at Linux extremely seriously because in technical, government and Internet space you hear a tremendous amount of enthusiasm for what's going on in the open source community," Passerelli says. Servers amount to 50% of SGI's revenue.

SGI'S LINUX LINEAGE

Silicon Graphics' behind-the-scenes Linux work:

July 1996	Hired an intern to port Linux to the SGI Indy workstation.
May 1997	Mailing list started for developers of Linux for SGI machines.
June 1998	Linux port to Indy, dubbed HardHat 5.1, nearly completed.
Dec. 1998	SGI joins Linux International as a sponsor.

"Stay tuned" is all SGI will officially say about Linux. Although further details are not available, SGI's 64-bit desktop and servers, which will be announced when Intel's Merced chip is complete, will be able to run Linux, as well as Windows NT and Irix, Passerelli says.

Meanwhile, sources indicate that SGI is talking to Linux providers, such as Red Hat Software, about supporting SGI hardware.

Linux is hardly as scalable as Irix, so don't expect to see SGI abandoning Irix, says an unnamed source. But Linux may be faster, at least according to the same source, who found that Linux is twice as fast as Irix on single-processor systems.

Whether SGI will ever officially endorse Linux remains to be seen.

The company has worked for two and a half years with Microsoft on high-end graphics, and a bold Linux pronouncement could jeopardize that relationship, some observers say. ■

Lucent

Continued from page 1

broadest product range."

While the companies share a belief in ATM, they arrived at the common vision from different angles. Ascend grew up as a key player in dial-up Internet access hardware, but evolved into one of the crucial providers of ATM switches to carriers. Lucent was born of the Bell system and has a voice-centric heritage.

Lucent has added to its line over the years and will have some product overlap with Ascend, notably, the Lucent PortMaster 4 high-end access concentrator and the Ascend MAX TNT. "I would keep the TNT, which has a greater presence in ISP networks," says John Morency, an analyst with Renaissance Worldwide.

Another option may be to meld the MAX TNT with the PortMaster, says Frank Dzubeck, president of Communications Network Architects, a Washington, D.C. consulting firm. Lucent's boxes are higher capacity than Ascend's, "but the software doesn't compare a lick to what Ascend has," he says.

Neither company would comment on product plans.

Whither the enterprise?

While the Ascend deal improves Lucent's carrier pitch, observers say it does little on the enterprise front, particularly in the company's competition with Nortel Networks, which last year bought Bay Networks.

McGinn makes it clear that carrier networks are his first priority. "This move with Ascend clearly solidifies our position as the undeniable leader in communications networking for service providers," he says.

As for the enterprise, McGinn says, "We will, as well, be investing organically and as appropriate to further our enterprise business."

Company officials have repeatedly downplayed the idea that Lucent would buy a traditional router vendor because they see the business as relatively slow-growth and low-margin.

"Lucent can't compete in the cost-per-port world," Dzubeck says. "It has an overhead structure that would choke a horse."

Another factor in sidestepping the enterprise is, not surprisingly, Cisco. In Lucent's view, "fighting Cisco where it dominates is a losing proposition," says Christine Heckart, vice president of TeleChoice.

Lucent officials are quick to point out the company gains an entree to make enterprise data sales through its large installed base of PBX and call center customers, particularly in newer, high-speed markets that are up for grabs. For example, Lucent's LAN switching group in Concord, Mass., claims to have sold more than 125,000 ports of its Cajun P550 Gigabit Routing Switch, which has Layer 2 and Layer 3 switching capabilities.

But Lucent's main enterprise push is managed services, which the company offers through its NetCare service subsidiary, Dzubeck says. Doug Ruby, vice president of product marketing for Lucent's enterprise group, confirms that most data product sales include NetCare services.

Ironically, NetCare has sold a large number of routers and other gear from Bay under a 1995 partnership. But now those sales are beginning to transition to Lucent's Gigabit Ethernet and campus ATM products.

Lucent's enterprise sales account for some $8 billion of its roughly $30 billion in annual sales, but the bulk of that is from sales of PBXs, call centers and voice messaging systems. Ruby says LAN switching accounts for just more than $250 million per year in revenue.

The merger with Ascend is scheduled to close at mid-year, meaning an integrated service pitch from the merged company might come in the third quarter. ■

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PIECES OF A PUZZLE? OR A UNIFIED WHOLE?

Key Lucent acquisitions since it was spun off from AT&T:

October 1996
Agile Networks
Ethernet and ATM switches

September 1997
Octel
Communications and voice messaging

January 1998
Prominet
Gigabit Ethernet

May 1998
Yurie Systems
ATM access gear

December 1997
Livingston Enterprises
Remote access

August 1998
LANNET
Workgroup and campus switching

October 1998
Quadritek
IP management software

January 1999
Kenan Systems
Carrier billing software

January 1999
Ascend
Core ATM and remote access

STEVE BORNS

Lucent's McGinn and Ascend's Ejabat are pleased with the merger.

Lucent snaps up Kenan Systems

No amount of convergence between voice and data networks is meaningful unless you can bill for it in a unified way, so Lucent has purchased a company that gives it just such a system to sell to service providers.

Lucent last week agreed to shell out $1.48 billion in stock for Kenan Systems, a Cambridge, Mass., provider of third-party billing and customer-care software.

Kenan's flagship product, Arbor/BP, delivers a unified bill containing charges for any combination of services, including local and long-distance telephony, mobile, broadband and Internet.

Unified billing is something carriers and their equipment suppliers have been hard-pressed to develop on their own, and Lucent has been no exception. Lucent's carrier software division has worked hard on operational support systems and service creation packages, says Lance Boxer, Lucent's president of communications software. But it has had to rely on partnerships for billing products. "We're filling a critical gap in our software portfolio," says Boxer, who recently joined Lucent after leaving his post as chief information officer at MCI. "We consider this a great coup."

Analysts agreed that Lucent chose the right provider. "I have had almost everybody in the industry tell me Kenan is the best at what they do," says Peter Bernstein, president of Infonautics Consulting in Ramsey, N.J.

Kenan's customer base mostly comprises competitive local exchange carriers and other new service providers. The company's presence among traditional carriers is far less, although it provides billing for some key carrier-affiliated ISPs, such as AT&T WorldNet and GTE Internetworking. Kenan also generates about 40% of its business from outside the U.S. — a big selling point for Lucent executives, who are hungry for international business.

"The need for what Kenan does is a relatively recent phenomenon," Bernstein says. Until recently, advanced billing has been an area of "benign neglect in the telecom industry and even worse in the cable industry."

One unusual aspect of Kenan is that its founder and president, Kenan Sahin, did not use stock options to entice talent into his operation and therefore owns the entire company. The result: Sahin stands to garner the entire $1.48 billion value of the Lucent stock.

Ascend buys and sells

Ascend last week had more than just the Lucent deal on its mind. The company offloaded Stratus Computer's Enterprise Computer Division, which makes fault-tolerant computers. Ascend sold the unit to Investcorp, a global investment firm that will keep the Stratus name and focus on making fault-tolerant computing platforms for enterprise markets, financial services and Internet banking.

Ascend bought Stratus last August for $822 million and, at the time, said it would sell off its nontelecommunications-related businesses. Ascend was after Stratus' expertise in carrier signaling and carrier network management software.

— David Rohde and Tim Greene

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Microsoft simplifies BackOffice management

By Christine Burns
Redmond, Wash.

Microsoft last week announced a version of its BackOffice suite that makes it easier to centrally set up and manage remote office servers.

Microsoft *wants users to see BackOffice 4.5 as an integrated package.*

One of BackOffice 4.5's new components, dubbed Server Manager, is an administrative interface that provides a single point of control for managing the rest of the applications in BackOffice. Server Manager ships with four standard console views, which give entry-level help desk technicians, Web administrators, branch administrators and central IT administrators the tools they need to do their jobs. Each console view can be customized to incorporate in-house or third-party management tools.

BackOffice 4.5 includes scripts that can be used to automate the deployment of multiple remote servers. Administrators can establish a standard server configuration script that can then be pushed to servers across multiple offices.

Users working with the beta applauded Microsoft's efforts to simplify remote deployment.

Carnival Cruise Lines is moving from Novell NetWare and Lotus cc:Mail to the BackOffice suite on 15 of its ships. System support manager John Masseria says preliminary tests show that Microsoft's new deployment tools will cut the amount of time needed to set up a BackOffice server from six days to one.

"The automation also helps us ensure the accuracy of how we configure each server," Masseria says. "Before, we had someone maintain a checklist as each configuration was established. Now we can configure once and be assured that all the settings are propagated accurately."

BackOffice 4.5 comprises the latest releases of Microsoft's server components, including SQL Server 7.0, Systems Management Server 2.0 and Windows NT Server 4.0 Service Pack 4. The other BackOffice 4.5 components are Internet Information Server 4.0, Transaction Server 2.0, Message Queue Server 1.0, Exchange Server 5.5, Proxy Server 2.0, SNA Server 4.0 and Site Server 3.0.

With BackOffice 4.5 — which is available in beta now — Microsoft is seeking to present the suite of Windows NT server applications as an integrated package. The BackOffice suite has traditionally been viewed by users as merely a cost-effective way to purchase multiple Microsoft applications, with little emphasis on integration among the components.

Microsoft also announced the availability of beta software for its low-end server application bundle, BackOffice for Small Business 4.5. This version includes tools for remote administration and for producing server status and log reports via e-mail or fax. An enhanced start-up engine includes an interactive help feature and a new wizard program that enables users to connect to any ISP via high-speed or dial-up connections.

The maximum number of users supported has been increased from 25 to 50. The maximum database size also has been raised to 10G bytes from 1G byte.

Both versions of BackOffice 4.5 are expected to ship in the second quarter.

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Backspin

Virtual crime, real world jail time

I just read Winn Schwartau's article, "Striking back: Corporate vigilantes go on the offensive to hunt down hackers" (*NW,* Jan. 11, page 1).

I met up with Winn at Comdex in November, and he told me he was working on the story. He explained the background and I was intrigued — the idea that companies would launch counterattacks against hackers is powerful. I envisioned network administrators launching digital counteroffensives and unleashing barrages of virtual artillery. Of course, I was being naive because I thought the response would be a purely digital salvo.

Mark Gibbs

With Winn was the pseudonymous "Lou Cipher," whose vigilante efforts were detailed in Winn's story. Cipher is a security honcho working for a large financial institution.

Cipher proceeded to discuss, quite candidly and enthusiastically, the various vigilante actions he and his henchmen had undertaken. I heard all about how they had broken into houses and removed the hacker's PCs and how they had to "discipline" more persistent recidivists with baseball bats (he emphasized that bat-smashing wasn't a frequent event).

Cipher appalled me for several reasons. To start, he relished his vigilantism. He recounted his stories of theft, threats and grievous bodily harm with the self-righteous satisfaction of someone who has few scruples and sees himself as a tough guy.

But it was his belief in the correctness of his actions and his assumed moral authority to do so that really irritated me. I asked him if he had ever made a mistake. Had he ever broken into a house looking for some 15-year-old hacker's PC and been in the wrong house? Well, of course, he hadn't committed the burglaries personally, and he assured me that he and his henchman hadn't made mistakes . . . as far as he knew.

What Cipher commissioned, and apparently plans to go on commissioning, amounts to first-degree burglary, and there's nothing romantic or even rational about theft as a response to hackers.

I told the story (except the name of the guilty) to Russ Hayes of the Ventura County District Attorney's Office, and he thought Cipher was full of it. But *Network World* checked Cipher's bona fides, and he seems all too real.

According to Hayes, first-degree burglary carries up to a six-year prison sentence. Hayes also pointed out that even though Cipher might not have actually done the job, "He would be as guilty as the thief," as would whoever in the company sanctioned such work. Add to that a charge of conspiracy, and we're talking serious time in the big house. As for correcting people's attitude with a baseball bat, I think we're looking a life sentence straight in the eye.

According to an informal survey Winn conducted, 23% of the respondents thought a physical response to a hacker attack was appropriate, while 54% thought a physical response was sometimes justified.

I'm shocked. That means that 77% thought physical responses were a reasonable course of action.

Let's see if Winn's results are accurate. I have created a more comprehensive survey at www.nwfusion.com, DocFinder 1128.

I don't have a problem with electronically defending yourself and even mounting a virtual counterattack. But when the activities extend into the real world, things are going too far. If your company is considering a physical response, remember that even if the police don't know much about cybercrime, they know more than enough about real world crime to throw your butts in jail.

No baseball bats to nwcolumn@gibbs.com or (800) 622-1108, Ext. 7504.

'Net Buzz

The latest on the internet/intranet industry

A SKEPTIC DIES, A BELIEVER IS BORN A couple of months ago, 'Net Buzz attempted an intervention designed to bring sanity back to the Internet IPO market. It seemed, at the time, that Internet speculators who were paying exorbitant prices for shares of one money-losing start-up after another needed to accept responsibility for their delusional investment behavior. They needed a reality slap, and if things got a little ugly, well, that's why they call it tough love.

But my pleas have fallen upon deaf ears. Not only have I been ignored, I have been mocked by a hyperventilating Internet stock market that continues to support and reward unproven business models and wild speculation.

If you owned shares of portal/search engine vendor **Yahoo** in the first week of January, for example, you doubled your portfolio value in less than 10 days. Prices of shares went from the low $200s to more than $400 by last week.

Online advertising start-up **DoubleClick** also saw its share price double in a week, from about $50 on Jan. 6 to $100 by last Tuesday.

Amazon.com, eBay, broadcast.com and many more Internet companies have seen their already overvalued stocks soar up, up, up this year, with only the occasional downdraft. And virtually every one of these high-flying Internet start-ups is operating at a loss, with profits for most not in sight any time soon.

Chris Nerney

So I've given up, for it has become clear that it is I who is out of step with reality. I have been engaging in "old think," a phrase used by many high-tech vendors in reference to the products they sold you two years ago when they are trying to get you to buy their new products.

I have been like the uptight, straight-laced parents of the 1950s who smugly predicted the rapid demise of "that crazy rock 'n' roll music." I just wasn't getting it. I wasn't "hep," or whatever it is you kids say today.

Last month, I would have said that anyone who buys Amazon.com for $150 a share is a fool. Today, I will congratulate that person for getting in on the ground floor and implore him to tell me the secret of his investing acumen.

I now see the folly of overanalyzing the Internet stock market, which, like rock 'n' roll, is about feeling rather than reason. Out with rigorous analysis and quarterly earnings, in with rampant optimism and a sledgehammer back beat. That's the winning ticket around here. And I want to be in on the fun. Therefore I have loosened my tie and am prepared to swing to whatever wild Internet stock rhythms cross my path.

A portal? Hey, if you're going online, you have to start somewhere, right? Now that's a business plan. Count me in.

A provider of streaming multimedia? It can't lose, everyone wants multimedia. Why, just the distance-learning market itself . . . OK, bad example. Still, this is a market bet, baby. We all win.

A retail Web site selling traditional and homeopathic remedies to native American peoples of the Southwest? It's a niche crying out for a market leader. The key is to get in first.

Whew! Due diligence, even Internet style, can be a drag. But it pays off in the end.

For you investors who still harbor doubts, who still cling to the old ways as I once did, here are two pieces of wisdom for the Internet era: 1) In the world of the Internet, there are no experts, so that means everyone is an expert; 2) If a company has received money from venture capitalists, then it *must* be a good investment because the venture capitalists always know what they're doing.

See you at the yacht club.

Have a tip or, better yet, an uninformed hunch about the next hot Internet stock? Contact Chris Nerney at (508) 820-7451 or cnerney@nww.com.

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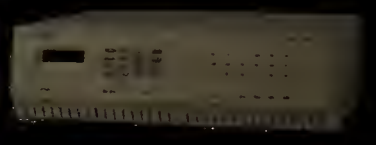

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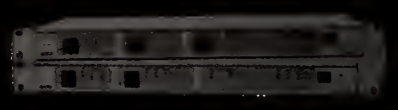

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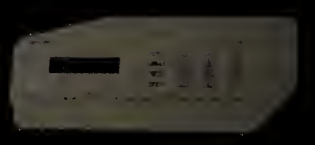

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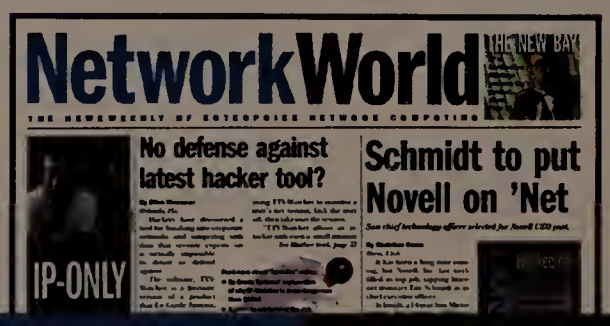

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